WESTERN BIRDS

Vol. 11, No. 1, 1980

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Quarterly Journal of Western Field Ornithologists

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Published: July 20, 1990

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WESTERN BIRDS

Volume 11, Number 1, 1980

AVIFAUNA OF THE PALOS VERDES PENINSULA, CALIFORNIA

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I dedicate this paper to Shirley Wells. Without her untiring efforts and constant encouragement I might never have completed the checklist. Shirley had been carefully compiling records of bird abundance on the peninsula for many years. Her records, combined with my own extensive card file, formed the heart of the list. Shirley's enthusiasm and expertise inspired all of us who had the pleasure of her acquaintance.

The avifauna of the Channel Islands off the coast of southern California has been studied by several workers (Howell 1917, Johnson 1972, Jones 1975). Some similarities exist between the fauna of these islands and adjacent mainland areas, such as the Palos Verdes Peninsula. Palos Verdes jutts out from the Los Angeles basin to a position about 35 km from Catalina Island, the nearest island (Figure 1), and supports an interesting flora and fauna showing affinities to that of the Channel Islands.

Records of bird distribution and abundance compiled by Shirley Wells and myself from 1965 to 1976 have been combined with published records to produce the annotated checklist presented here. The list includes a large number of rare and vagrant species, as well as a number of species now extirpated from the peninsula. The bulk of the abundance data pertains to regular visitors and resident species. As with all lists based primarily upon field observations, descriptions of relative abundance are probably biased by the observability of each species. Perhaps the most obvious bias in the list is treatment of open ocean species. For this study all species that occur within the designated circle are included, although data on strictly pelagic species are scanty at best.

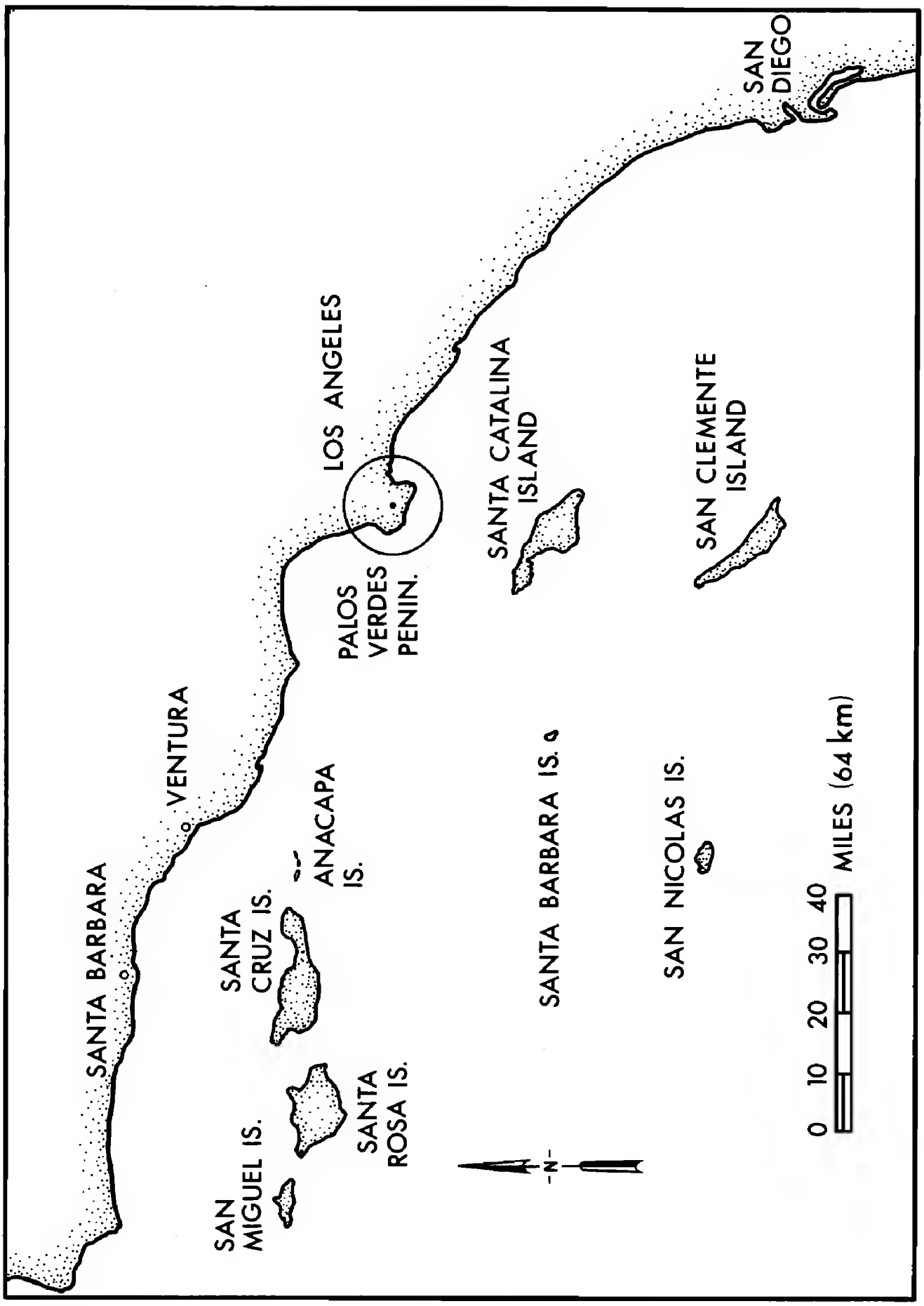

Figure 1. The Palos Verdes Peninsula, Los Angeles Co., California, and adjacent Channel Islands.

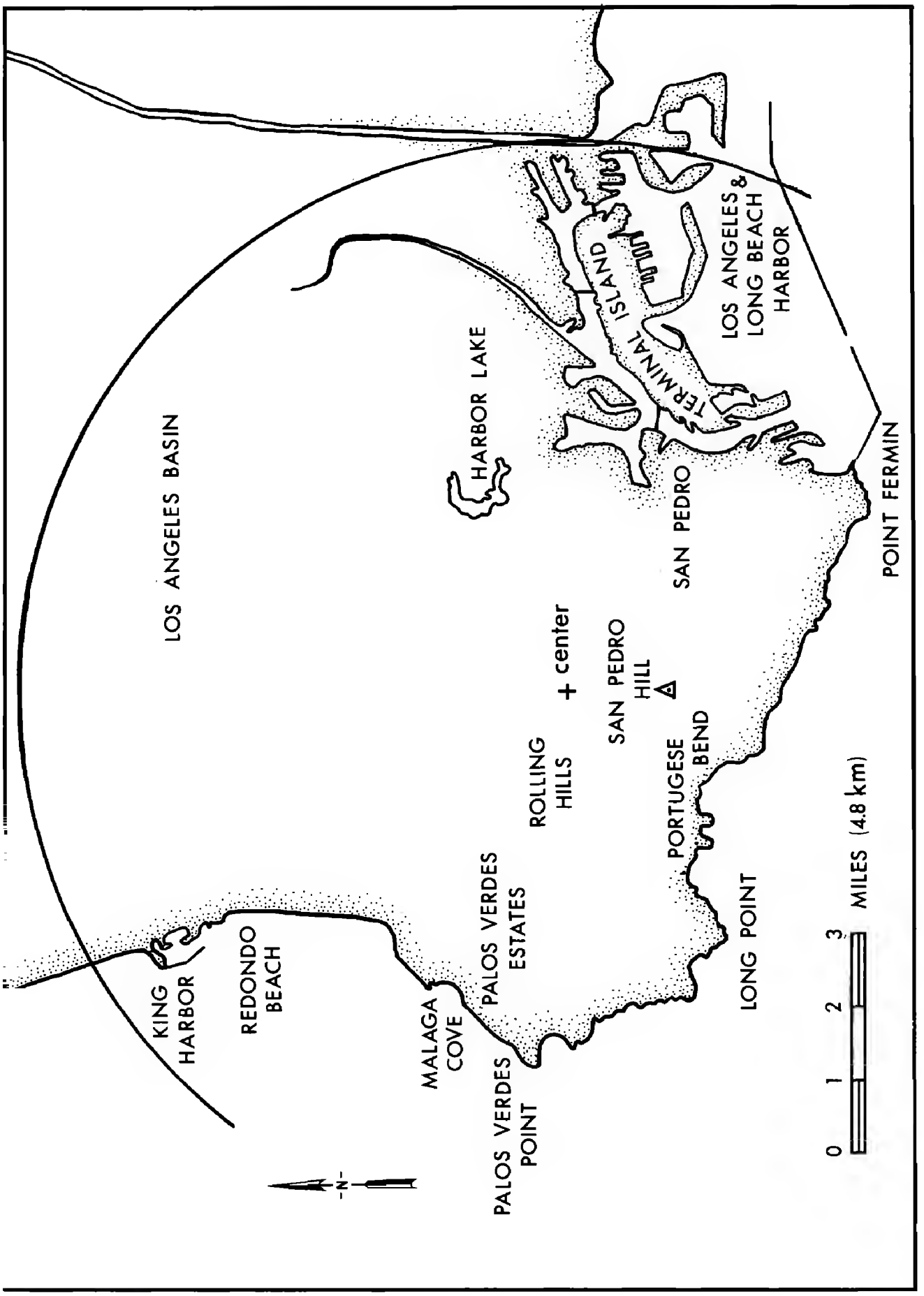

Figure 2. The Palos Verdes Peninsula. Circle corresponds to the Christmas Bird Count area, centered at 33°46′10″ N, 118°20′18″ W, with a diameter of 24.2 km (15 mi).

DESCRIPTION OF AREA

The Palos Verdes Peninsula rises abruptly out of the Pacific Ocean to a maximum elevation of 451 m. The hills slope down gradually to the north and east into the Los Angeles basin. The highest point on the peninsula is San Pedro Hill, located at 33°45′45″ N, 118°20′10″ W (Figure 1). This peninsula is located approximately 32 km southeast of the Santa Monica Mountains, 56 km south of the San Gabriel Mountains and 48 km west of the Santa Ana Mountains.

The Palos Verdes Peninsula, for purposes of this paper, includes all of the area within a 24.2 km (15 mi) diameter circle, centered 1.1 km WSW of the intersection of Palos Verdes Drive North and Palos Verdes Drive East, 33°46′10″ N, 118°20′18″ W, San Pedro, Los Angeles County (Figure 2). This area has been previously described as a count circle for the National Audubon Society's annual Christmas Bird Count (Bradley and Wells 1969). It encompasses the Palos Verdes hills and surrounding lowlands and includes all or part of the following cities: Carson, Gardena, Harbor City, Hermosa Beach, Long Beach, Lawndale, Manhattan Beach, Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates, San Pedro, Torrance and Wilmington. The area includes approximately 82.9 km² of hills, 170.9 km² of flat land and 204.6 km² of open ocean.

Steep cliffs (approximately 30 to 65 m high) face the ocean along the entire shoreline from Malaga Cove south to Point Fermin. The western and southern slopes of the peninsula are relatively steep and are distinctly terraced. The terraces (evidence of former shorelines) are much less distinct on the more gradual eastern and northern slopes. Many large gullies and canyons drain the hills. Although a few of these canyons have relatively permanent streams, most smaller creeks are dry throughout much of the year.

Geologically the Palos Verdes Peninsula is an active area. Many rapid periods of uplift have helped to create the terraced hills (Woodring et al. 1946). There are also a few areas of recent subsidence such as the Portuguese Bend region. The peninsula was probably an island until it became joined to the mainland during the Quaternary, and it also shows stratigraphic similarities to the southern Channel Islands (Valentine and Lipps 1967).

The vegetation of the Palos Verdes Peninsula has been extensively altered by spreading suburban and agricultural development. During the early days under Spanish rule the Rancho Palos Verdes was utilized as grazing land for herds of beef cattle. For a detailed account of the early history of this area see Fink (1966). Much of the native vegetation has been lost or severely restricted. The more open

hilltops and the gentle slopes were originally dominated by various native grasses. The steeper gullies and canyons were covered with an association of coastal sage and chaparral species.

Today the remaining open fields are planted with grain, garbanzo beans and various other commercial crops. Sprawling suburban development had a less adverse effect on the gullies and canyons. In these areas, as well as on some of the steeper southern slopes, some native vegetation persists. The dominant species in gullies and canyons include: Lemonadeberry (*Rhus integrifolia*), California Sagebrush (*Artemesia californica*), buckwheat (*Eriogonum* spp.), sage (*Salvia* sp.), Black Mustard (*Brassica nigra*), and Prickly Pear (*Opuntia occidentalis*).

Suburban residential areas currently make up about 60% of the peninsula's land area. Several different habitats are within the general classification of suburban residential. The chief variants are the age of housing tracts and the relative density of houses. Many older areas have relatively low-density housing as well as luxuriant growths of trees and shrubs. The most mature and densely vegetated areas are located in Palos Verdes Estates on the northwestern slope of the peninsula. Here large numbers of ornamental shrubs and trees create a semi-forest habitat. The parkland areas with larger pines, *Eucalyptus* and broad-leaf evergreen trees are important nesting habitats for a variety of bird species. The newer, high-density tracts support few bird species.

The peninsula's northern slope is dominated by a more open *Eucalyptus* habitat (introduced in 1908 and the 1920s). In the cities of Rolling Hills and Rolling Hills Estates are a large number of horse stables and some open pastures. Here the canyons contain dense growths of various brush species as well as a few willow-grown streams. These north-facing slopes are subjected to higher summer temperatures and lower humidity than the western and southern portions of the peninsula. Larger parks, golf courses and cemeteries on the peninsula are planted with a bewildering variety of introduced trees and shrubs and support a number of bird species. The majority of the native bird species, however, still nest in the less disturbed canyons.

A distinct belt of vegetation inhabits the talus slopes and steep rocky cliffs facing the ocean. Low perennials and patchy growths of Lemonadeberry are characteristic here. This belt contains many plant species which are characteristic of Channel Island floras (Dunkle 1950).

Along the nearly 26 km of rocky shoreline is a rich algal flora (Bradley et al. 1972). In deeper water there were once extensive Giant Kelp (*Macrocystis pyrifera*) beds which have been largely

destroyed by metropolitan pollution (Dawson 1966). Recent attempts have been made to reestablish kelp beds along the peninsula shoreline.

The area that is now occupied by Los Angeles and Long Beach harbors was at one time an extensive *Salicornia* marsh. Willow-grown sloughs extended north from the estuary through freshwater marshes and the small lake now called Harbor Lake. The sloughs continued north to meet the low lying areas of Dominquez Channel. Along the coast north of Malaga Cove were sand beaches and grass-covered bluffs and dunes that represented Coastal Strand habitat (Munz and Keck 1959). Terminal Island (formerly Rattlesnake Island) also possessed fairly extensive Coastal Strand habitat above the *Salicornia* marsh.

ISLAND AFFINITIES

One of the most intriguing facets of the avifauna of Palos Verdes is that a relatively large number of common southern California species are absent or occur only as migrants on the peninsula, though they nest commonly in similar habitat on adjacent portions of the mainland. (Tables 1 and 2). These absentees include some of the indicator species for chaparral and coastal sage communities. For example there are no records for the Wrentit, a species generally considered "the voice of the chaparral." Some missing species have been recorded as vagrants to the peninsula and may represent potential colonizers.

The absence of these species is more interesting when compared to species absent from the adjacent Channel Islands. A comparison with the partial list given by Johnson (1972) corresponds almost perfectly. The only species listed by Johnson as absent that is present on the Palos Verdes Peninsula is the Brown Towhee. When the list of absentees is compared with the lists for the various individual islands, the similarity is even more striking. There are a few species whose absence may be attributed to lack of appropriate habitat, for example, Acorn Woodpecker and White-breasted Nuthatch.

Table 1. Common species in coastal southern California that are not known to occur on the Palos Verdes Peninsula.

Mountain Quail	Wrentit
Screech Owl	Western Bluebird
Plain Titmouse	Mountain Bluebird

Table 2. Common or formerly common breeding species in coastal southern California that have been recorded only as vagrants or migrants on the Palos Verdes Peninsula.

Band-tailed Pigeon	Bell's Vireo
Acorn Woodpecker	Wilson's Warbler
Nuttall's Woodpecker	Blue Grosbeak
White-breasted Nuthatch	Lawrence's Goldfinch
House Wren	Sage Sparrow
California Thrasher	Black-chinned Sparrow

Another evident similarity between the avifaunas of the Channel Islands and the peninsula is the occurrence of a number of insular endemic subspecies on the peninsula. The Lutescent Orange-crowned Warbler (*Vermivora celata lutescens*) is a common summer visitor and migrant throughout coastal southern California. This subspecies breeds in suitable habitat in the coastal hills and mountains of Los Angeles and Orange counties adjacent to the Palos Verdes Peninsula. On the peninsula this subspecies is replaced by the chiefly insular form, the Dusky Orange-crowned Warbler (*V. c. sordida*) (Grinnell and Miller 1944). My analysis of museum specimens at the Los Angeles County Museum of Natural History, as well as preliminary banding studies, reveals that most specimens can be identified to subspecies with morphometric data. Nesting birds banded on the peninsula belong to *V. c. sordida*. Tape recordings of Orange-crowned Warblers in southern California reveal that *V. c. sordida* has consistently slower and lower pitched songs than *V. c. leutescens* (Bradley unpubl.). The only other place where the Dusky Orange-crowned Warbler nests on the mainland, Point Loma, San Diego County, is also a peninsula with insular floral and faunal affinities. Johnson (1972) mentioned that this subspecies has not expanded its range beyond the "immediate" coast. The Dusky Orange-crowned Warbler is generally distributed and nests throughout the canyons and gullies of the peninsula along the coastal slopes as well as on the inland slopes to the north and east.

Another interesting example of an island endemic on Palos Verdes is the Channel Island form of the Allen's Hummingbird (*Selasphorus sasin sedentarius*). Apparently this subspecies has only recently established a population on the peninsula. Shirley Wells and Gary Stiles first discovered its nesting in 1969 (Wells and Baptista 1979). Since then the subspecies has spread throughout much of the peninsula and is a common resident. In the sense that the Palos Verdes peninsula is isolated from the remainder of the mainland, this invasion could be considered intra-island colonization rather than "recolonization of the mainland" as described by Johnson (1972). It

should also be noted that the mainland race (*S. s. sasin*) is a regular migrant through the peninsula.

At least two other species may be represented by their insular endemic subspecies on the peninsula. One, the Western Flycatcher (*Empidonax difficilis*), nests on the peninsula. Unfortunately no specimens of this population have been compared with those studied by Johnson. Some evidence suggests that the peninsula population belongs to *E.d. insulicola* (S. Wells pers. comm.). Another species that includes an island endemic subspecies is the Rufous-sided Towhee (*Pipilo erythrophthalmus*). Individuals of this species measured during banding operations on the peninsula may belong to the island subspecies *P.e. clementae* (Bradley and Wells unpubl.). More work needs to be done with both species before definite conclusions can be made.

Sound recordings yield additional evidence of the "isolated" nature of the peninsula's avifauna. As mentioned earlier, members of the insular subspecies of the Orange-crowned Warbler possess a distinctive "song dialect" on the peninsula. Members of the peninsula population of the House Finch have also been recorded. Analysis of these recordings indicates a dialect distinctive from those recorded elsewhere on the southern California mainland (Bradley unpubl.).

Related to endemism and isolation is the occurrence of short term invasionary populations of various species. On the peninsula a number of species have colonized the area for a year or two and then disappeared. These species include Red-breasted Nuthatch, Lazuli Bunting, Red Crossbill, and perhaps the Black-chinned Sparrow. At least two of these, the Red-breasted Nuthatch and the Red Crossbill, are "invasionary" species throughout much of their ranges, and their sporadic occurrence in a particular locale with irregular breeding is "typical." Nevertheless the occurrence and subsequent disappearance of any population from the mainland represent the form of turnover described by Diamond (1969).

Table 3. Species that no longer nest on the Palos Verdes Peninsula.

Great Egret
Least Bittern
American Bittern
Fulvous Whistling-Duck
Clapper Rail
Virginia Rail
Sora
Snowy Plover
American Avocet
Black-necked Stilt
Yellow-billed Cuckoo
Belted Kingfisher
Downy Woodpecker
Western Kingbird
Horned Lark
Rough-winged Swallow
Blue Grosbeak
Savannah Sparrow
Grasshopper Sparrow

The chief factor affecting avifaunal turnover on Palos Verdes has been man. The extensive habitat modification that has occurred since the appearance of modern man correspondingly affected the avifauna. A number of species have been extirpated from the peninsula. Most of these were residents of coastal marshes, which were destroyed by the development of Los Angeles and Long Beach harbors. At first, extensive changes were wrought by cattle grazing associated with early Spanish settlers. Agricultural activities caused more changes, and rapid urban and suburban development have further modified the area. Most of the above changes caused drastic declines or extirpation of native species. Species that no longer breed on the peninsula are listed in Table 3. Increased irrigation and planting extensive "forests" of introduced trees and shrubs have allowed certain species to expand their populations. Examples include Anna's Hummingbird, Common Flicker, Cliff Swallow, Common Crow, Scrub Jay, Mockingbird, American Robin, Hooded Oriole, Northern Oriole, Brewer's Blackbird, Brown-headed Cowbird, House Finch, American Goldfinch, Lesser Goldfinch, Rufous-sided Towhee and Brown Towhee.

CHECKLIST TERMINOLOGY

Abundant - species seen in large numbers on nearly every trip to suitable habitat by a competent observer. A few species that are highly vocal but inconspicuous are listed as common or fairly common, though they are rarely seen. There are undoubtedly other inconspicuous and quiet species whose relative abundance has been underestimated.

Very common - seen on nearly every trip but usually in fewer numbers than abundant species, occasionally only a few individuals.

Common - seen on about 75% of the half-day trips made to suitable habitat by a competent observer.

Fairly common - seen on about 50% of the trips as above.

Uncommon - seen on about 25% of the trips as above.

Rare - seen only occasionally, usually at least one report each year.

Casual - fewer than 10 records for the peninsula.

Accidental - only one or two records for the peninsula.

ANNOTATED CHECKLIST

COMMON LOON, *Gavia immer*. Fairly common winter visitor. Occurs along coast primarily on the northern rocky shoreline and off Redondo Beach. Decreasing in recent years. A few non-breeding individuals present in most summers.

ARCTIC LOON, *Gavia arctica*. Distribution and status essentially same as Common Loon.

RED-THROATED LOON, *Gavia stellata*. Distribution like Common Loon, less common during summer.

RED-NECKED GREBE, *Podiceps grisegena*. Casual winter visitor, primarily along rocky coastline. One record for Harbor Lake 2 Oct 1970 (RS).

HORNED GREBE, *Podiceps auritus*. Fairly common winter visitor, predominately along the northern rocky shoreline and Redondo Beach.

EARED GREBE, *Podiceps nigricollis*. Common winter visitor along coast, a few non-breeding individuals. Formerly nested irregularly at Bixby Slough (Willett 1933), no recent nesting records.

WESTERN GREBE, *Aechmophorus occidentalis*. Very common winter visitor along coast, a few non-breeding individuals. Decreasing in recent years.

PIED-BILLED GREBE, *Podilymbus podiceps*. Common resident in fresh water, breeds at Harbor Lake, rare along coast.

SHORT-TAILED ALBATROSS, *Diomedea albatrus*. Specimen taken at San Pedro 3 Apr 1898 (Grinnell and Miller 1944). May have occurred regularly within the count circle in past years, but there are very few recent records for California.

BLACK-FOOTED ALBATROSS, *Diomedea nigripes*. Pelagic, rare in this area.

NORTHERN FULMAR, *Fulmarus glacialis*. Irregular winter visitor; most years absent but some years common. Predominately pelagic, visible from shore in flight years.

PINK-FOOTED SHEARWATER, *Puffinus creatopus*. Fairly common pelagic migrant; sometimes visible from shore.

SOOTY SHEARWATER, *Puffinus griseus*. Very common pelagic migrant; frequently visible from shore during stormy weather, especially in fall.

SHORT-TAILED SHEARWATER, *Puffinus tenuirostris*. Accidental; two sight records, one from shore Oct 1972 (DB & RS), and one from a boat 18 Dec 1972 (AS).

MANX SHEARWATER, *Puffinus puffinus*. Pelagic, probably uncommon. Has been observed from shore.

BLACK STORM-PETREL, *Oceanodroma melania*. Pelagic, has been observed from shore.

WHITE PELICAN, *Pelecanus erythrorhynchos*. Rare winter visitor.

BROWN PELICAN, *Pelecanus occidentalis*. Common post-breeding wanderer or fall migrant, fairly common winter visitor, and uncommon non-breeding summer visitor.

BLUE-FOOTED BOOBY, *Sula nebouxii*. Casual in fall (McCaskie 1972).

DOUBLE-CRESTED CORMORANT, *Phalacrocorax auritus*. Fairly common, non-breeding resident. Decreasing in recent years.

BRANDT'S CORMORANT, *Phalacrocorax penicillatus*. Uncommon or fairly common, non-breeding resident. Decreasing in recent years.

PELAGIC CORMORANT, *Phalacrocorax pelagicus*. Uncommon or fairly common, non-breeding resident. Decreasing in recent years.

MAGNIFICENT FRIGATEBIRD, *Fregata magnificens*. Casual, summer and fall. Two recent records are of immature plumaged individuals.

GREAT BLUE HERON, *Ardea herodias*. Uncommon, primarily in summer at Harbor Lake, decreasing in recent years.

GREEN HERON, *Butorides striatus*. Fairly common resident, probably still breeds at Harbor Lake.

LITTLE BLUE HERON, *Florida caerulea*. Accidental; one at Harbor Lake, 24 Nov 1971 (AS,SW) (McCaskie 1972).

CATTLE EGRET, *Bubulcus ibis*. Accidental. Harbor Lake, one 17 Nov 1972 (RB) and six during Jan 1974 (SW). More records can be expected as this species continues its range expansion.

GREAT EGRET, *Casmerodius albus*. Rare winter visitor, decreasing in recent years.

SNOWY EGRET, *Egretta thula*. Uncommon winter visitor, decreasing in recent years.

BLACK-CROWNED NIGHT HERON, *Nycticorax nycticorax*. Common breeding resident, occasionally seen in large flocks in winter.

YELLOW-CROWNED NIGHT HERON, *Nyctanassa violacea*. Accidental. One at Harbor Lake, 20 May - 2 Jun 1963 (GV) (McCaskie 1963).

LEAST BITTERN, *Ixobrychus exilis*. Old breeding record (Grinnell and Miller 1944). Only recent record was "a single bird at Harbor Park [Bixby Slough], October 8 [1960] (Russell and Marion Wilson). This species appears there regularly" (Small 1961). This inconspicuous bird has been sighted on three occasions since we began our records in 1965.

AMERICAN BITTERN, *Botaurus lentiginosus*. Old breeding record for Bixby Slough (Willett 1933). Few records in recent years, all in winter.

WHITE-FACED IBIS, *Plegadis chihi*. Rare fall migrant at Harbor Lake. Formerly a common winter visitor to the salt marshes of Los Angeles Harbor and Bixby Slough.

WHISTLING SWAN, *Olor columbianus*. Formerly wintered in small flocks in the sloughs and marshes (Willett 1933), no recent records.

CANADA GOOSE, *Branta canadensis*. Uncommon winter visitor.

BRANT, *Branta bernicla*. Uncommon winter visitor along coast.

WHITE-FRONTED GOOSE, *Anser albifrons*. Casual, fall and winter.

SNOW GOOSE, *Chen caerulescens*. Uncommon transient, overhead and at Harbor Lake.

FULVOUS WHISTLING-DUCK, *Dendrocygna bicolor*. Nested at Bixby Slough in 1903, and was "still fairly common" as a migrant in 1933 (Willett 1933). No recent records.

MALLARD, *Anas platyrhynchos*. Common winter visitor, also introduced and feral at Harbor Lake and several other parks.

GADWALL, *Anas strepera*. Uncommon winter visitor on freshwater ponds.

PINTAIL, *Anas acuta*. Abundant winter visitor at Harbor Lake and other freshwater ponds.

GREEN-WINGED TEAL, *Anas crecca*. Very common winter visitor at Harbor Lake and other freshwater ponds.

BLUE-WINGED TEAL, *Anas discors*. Casual, in winter at Harbor Lake.

CINNAMON TEAL, *Anas cyanoptera*. Abundant winter visitor at Harbor Lake and other freshwater ponds, as well as Los Angeles Harbor. Very common breeding resident at Harbor Lake, threatened by further development.

AMERICAN WIGEON, *Anas americana*. Very common winter visitor to freshwater lakes and ponds.

NORTHERN SHOVELER, *Anas clypeata*. Very common winter visitor to freshwater lakes and ponds.

REDHEAD, *Aythya americana*. Fairly common winter visitor to freshwater lakes and ponds. One old breeding record for Bixby Slough (Willett 1933).

RING-NECKED DUCK, *Aythya collaris*. Uncommon winter visitor to freshwater lakes and ponds.

CANVASBACK, *Aythya valisineria*. Common winter visitor to freshwater lakes and ponds.

GREATER SCAUP, *Aythya marila*. Rare, or rarely reported, winter visitor to the Los Angeles Harbor area.

LESSER SCAUP, *Athya affinis*. Common winter visitor to fresh water and Los Angeles Harbor.

COMMON GOLDENEYE, *Bucephala clangula*. Accidental. Two pair, Bixby Slough [no date] (Willett 1933).

BUFFLEHEAD, *Bucephala albeola*. Fairly common winter visitor to both fresh and salt water habitats.

OLDSQUAW, *Clangula hyemalis*. Casual in winter along coast. Most records are for Terminal Island.

WHITE-WINGED SCOTER, *Melanitta deglandi*. Common but irregular winter visitor. In some years almost as numerous as Surf Scoter but in other years, quite rare. Occurs along coast and in Los Angeles Harbor.

SURF SCOTER, *Melanitta perspicillata*. Abundant winter visitor to coast and harbor. Non-breeding individuals summer over occasionally.

BLACK SCOTER, *Melanitta nigra*. Rare and irregular winter visitor to coast and harbor. Flocks of up to 14 have been observed, but the usual number is one or two individuals.

RUDDY DUCK, *Oxyura jamaicensis*. Very common winter visitor. Common breeding resident at Harbor Lake.

COMMON MERGANSER, *Mergus merganser*. Casual in winter.

RED-BREASTED MERGANSER, *Mergus serrator*. Common to very common winter visitor in small groups along coast.

HOODED MERGANSER, *Lophodytes cucullatus*. Accidental. One, South Coast Botanic Garden 16 Nov 1975 through Mar 1976 (EB, SW, GN).

TURKEY VULTURE, *Cathartes aura*. Rare transient. Little or no suitable habitat remains.

WHITE-TAILED KITE, *Elanus leucurus*. Uncommon winter visitor.

GOSHAWK, *Accipiter gentilis*. Accidental. One, South Coast Botanic Gardens 17-28 Jan 1974 (SW).

SHARP-SHINNED HAWK, *Accipiter striatus*. Fairly common winter visitor, usually in wooded areas.

COOPER'S HAWK, *Accipiter cooperii*. Fairly common winter visitor, uncommon breeding resident.

RED-TAILED HAWK, *Buteo jamaicensis*. Common breeding resident, numbers increase in winter. Decreasing in recent years due, in part, to heavy loss of chicks to falconers.

RED-SHOULDERED HAWK, *Buteo lineatus*. Rare winter visitor to wooded areas.

BROAD-WINGED HAWK, *Buteo platypterus*. Casual, records for Rolling Hills and San Pedro (McCaskie 1968).

ZONE-TAILED HAWK, *Buteo albonotatus*. Accidental. One, Point Fermin, 10 Nov 1975 (SW, JMo).

ROUGH-LEGGED HAWK, *Buteo lagopus*. Casual winter visitor, usually over open fields.

FERRUGINOUS HAWK, *Buteo regalis*. Accidental. One, Harbor Park, 31 Dec 1966 (DBn) and one near landfill on Crenshaw Blvd., 15 Nov 1972 (SW).

GOLDEN EAGLE, *Aquila chrysaetos*. Casual in winter.

BALD EAGLE, *Haliaeetus leucocephalus*. Casual in winter. One unsubstantiated record of nesting along cliffs near Lunada Bay (1931; Fink 1966).

MARSH HAWK, *Circus cyaneus*. Uncommon or rare winter visitor. Formerly common in salt marshes of Los Angeles Harbor.

OSPREY, *Pandion haliaetus*. Rare transient and winter visitor. Once common in salt marshes of Los Angeles Harbor; no recent breeding records for southern California.

PRAIRIE FALCON, *Falco mexicanus*. Casual in winter near quarry at the end of Via Forestal, near Portuguese Bend.

PEREGRINE FALCON, *Falco peregrinus*. Casual in winter.

MERLIN, *Falco columbarius*. Casual in winter.

AMERICAN KESTREL, *Falco sparverius*. Very common breeding resident. Like Red-tailed Hawk, suffers heavy losses to local falconers.

CALIFORNIA QUAIL, *Lophortyx californicus*. Common breeding resident, decreasing in recent years as housing developments encroach on breeding habitat.

RING-NECKED PHEASANT, *Phasianus colchicus*. Introduced, common breeding resident in brushy areas or near open fields, declining.

CHUKAR, *Alectoris chukar*. Introduced in the 1930s, but apparently never became established. A few records within last 10 years.

COMMON PEAFOWL, *Pavo cristatus*. Introduced, very common breeding resident, apparently increasing.

SANDHILL CRANE, *Grus canadensis*. Accidental. One flying overhead 4 Oct 1972 (RS).

CLAPPER RAIL, *Rallus longirostris*. Extirpated. *R.l. obsoletus* was a common breeding resident in salt marshes of Los Angeles Harbor, but no habitat remains. One breeding record for Bixby Slough 14 Jun 1906 (Willett 1933).

VIRGINIA RAIL, *Rallus limicola*. Rare and inconspicuous winter visitor, decreasing with continued habitat destruction. Recent records are from Harbor Lake and Madrona marsh. Undoubtedly nested in extensive freshwater marshes formerly present.

SORA, *Porzana carolina*. Uncommon and inconspicuous winter visitor, decreasing in recent years. Formerly nested in freshwater marshes of Bixby Slough.

COMMON GALLINULE, *Gallinula chloropus*. Rare and secretive resident, more frequently seen in winter. Several old breeding records for Bixby Slough. A few may still nest at Harbor Lake.

AMERICAN COOT, *Fulica americana*. Abundant breeding resident, most numerous in winter.

BLACK OYSTERCATCHER, *Haematopus bachmani*. Casual in winter along rocky shorelines.

AMERICAN OYSTERCATCHER, *Haematopus palliatus*. Accidental. One, Point Fermin 22 Dec 1978 - spring 1979 (DH).

SEMIPALMATED PLOVER, *Charadrius semipalmatus*. Uncommon winter visitor along coast, primarily on sandy beaches, and at Harbor Lake.

SNOWY PLOVER, *Charadrius alexandrinus*. Fairly common winter visitor, less common in summer, along sandy beaches. Formerly nested at Bixby Slough (Grinnell and Miller 1944), no recent breeding records.

KILLDEER, *Charadrius vociferus*. Abundant breeding resident. In winter frequents parks, coast and marshes.

AMERICAN GOLDEN PLOVER, *Pluvialis dominica*. Casual in spring and fall.

BLACK-BELLIED PLOVER, *Pluvialis squatarola*. Abundant winter visitor to all aquatic habitats. Occurs at all times except mid-summer.

RUDDY TURNSTONE, *Arenaria interpres*. Fairly common winter visitor, primarily along southern coast and Los Angeles Harbor.

BLACK TURNSTONE, *Arenaria melanocephala*. Common winter visitor along rocky shoreline.

COMMON SNIPE, *Capella gallinago*. Common but inconspicuous winter visitor to freshwater ponds and lakes.

LONG-BILLED CURLEW, *Numenius americanus*. Uncommon winter visitor to open fields and lawns.

WHIMBREL, *Numenius phaeopus*. Fairly common winter visitor along rocky shore, most common during migration.

SPOTTED SANDPIPER, *Actitis macularia*. Very common winter visitor along rocky shoreline.

SOLITARY SANDPIPER, *Tringa solitaria*. Casual in fall and spring at Harbor Lake and South Coast Botanic Gardens.

GREATER YELLOWLEGS, *Tringa melanoleucus*. Uncommon winter visitor, fairly common transient.

LESSER YELLOWLEGS, *Tringa flavipes*. Rare transient.

WANDERING TATTLER, *Heteroscelus incanus*. Common winter visitor, sparsely distributed along rocky shore.

SURFBIRD, *Aphriza virgata*. Uncommon winter visitor primarily along rock jetties and breakwaters. Fairly common transient along coast in small flocks.

WILLET, *Catoptrophorus semipalmatus*. Abundant winter visitor, some non-breeding individuals present in summer.

RED KNOT, *Calidris canutus*. Rare transient and winter visitor.

PECTORAL SANDPIPER, *Calidris melanotus*. Rare fall migrant.

BAIRD'S SANDPIPER, *Calidris bairdii*. Rare fall migrant.

LEAST SANDPIPER, *Calidris minutilla*. Formerly very common winter visitor, decreasing in recent years.

DUNLIN, *Calidris alpina*. Uncommon winter visitor.

WESTERN SANDPIPER, *Calidris mauri*. Formerly very common winter visitor, now decreasing.

SANDERLING, *Calidris alba*. Abundant winter visitor along coast.

SHORT-BILLED DOWITCHER, *Limnodromus griseus*. Common winter visitor, along coast and Harbor Lake.

LONG-BILLED DOWITCHER, *Limnodromus scolopaceus*. Fairly common winter visitor, more frequently observed in freshwater habitats (Pyle and Small 1961).

BUFF-BREASTED SANDPIPER, *Tryngites subruficollis*. Accidental. One, Green Hills Cemetery 5-17 Sep 1971 (SW) (McCaskie 1972).

MARBLED GODWIT, *Limosa fedoa*. Fairly common winter visitor, primarily along sandy beaches.

AMERICAN AVOCET, *Recurvirostra americana*. Uncommon winter visitor. Formerly nested in Bixby Slough-Harbor Lake area.

BLACK-NECKED STILT, *Himantopus mexicanus*. Fairly common winter visitor, rare resident. Formerly nested in Bixby Slough-Harbor Lake area.

RED PHALAROPE, *Phalaropus fulicarius*. Primarily pelagic, seen from shore in migration or in winter.

WILSON'S PHALAROPE, *Steganopus tricolor*. Uncommon transient in freshwater habitats.

NORTHERN PHALAROPE, *Lobipes lobatus*. Primarily pelagic, but seen along coast in migration and in winter.

POMARINE JAEGER, *Stercorarius pomarinus*. Uncommon winter visitor. Primarily pelagic, rarely seen from shore.

PARASITIC JAEGER, *Stercorarius parasiticus*. Uncommon winter visitor. Primarily pelagic, occasionally seen from shore.

SOUTH POLAR SKUA, *Catharacta maccormacki*. Accidental. One seen from Long Point 24 Dec 1966 (SW).

GLAUCOUS GULL, *Larus hyperboreus*. Accidental. One immature photographed at Terminal Island fish cannery 22 Dec 1973 - 15 Feb 1974.(GSS, RB) (Suffel 1974).

GLAUCOUS-WINGED GULL, *Larus glaucescens*. Fairly common winter visitor along coast.

WESTERN GULL, *Larus occidentalis*. Very common winter visitor. Immatures are common all year.

HERRING GULL, *Larus argentatus*. Common winter visitor.

THAYER'S GULL, *Larus thayeri*. Probably fairly common winter visitor, but few have been reported.

CALIFORNIA GULL, *Larus californicus*. Abundant winter visitor.

RING-BILLED GULL, *Larus delawarensis*. Abundant winter visitor.

MEW GULL, *Larus canus*. Common winter visitor.

FRANKLIN'S GULL, *Larus pipixcan*. Rare in fall and winter along coast, Los Angeles Harbor and Harbor Lake.

BONAPARTE'S GULL, *Larus philadelphia*. Abundant winter visitor.

LITTLE GULL, *Larus minutus*. Accidental. One along northern coast 22 Dec 1969, photographed and seen by many observers (RS, GMc) (McCaskie 1970).

HEERMANN'S GULL, *Larus heermanni*. Abundant winter visitor. Immatures are very common all year.

BLACK-LEGGED KITTIWAKE, *Rissa tridactyla*. Irregular winter visitor, quite common along coast in some years, whereas strictly pelagic in others.

SABINE'S GULL, *Xema sabini*. Accidental. One, Hermosa Beach 20 May 1926 (FS).

FORSTER'S TERN, *Sterna forsteri*. Uncommon winter visitor and common transient.

COMMON TERN, *Sterna hirundo*. Rare winter visitor and migrant.

ARCTIC TERN, *Sterna paradisaea*. Pelagic, status uncertain. One, Cabrillo Beach 30 Aug 1968 (DB, RB).

LEAST TERN, *Sterna albifrons*. Rare summer visitor and migrant. Grinnell and Miller (1944) list Redondo and Terminal Island as nesting localities. Nested on Terminal Island in 1973, 1974, 1976 and 1977.

ROYAL TERN, *Sterna maxima*. Uncommon winter visitor.

ELEGANT TERN, *Sterna elegans*. Common, August to mid-October.

CASPIAN TERN, *Sterna caspia*. Common visitor in late summer, fall and winter.

BLACK TERN, *Chlidonias niger*. Casual in spring and fall. Formerly common in summer at Bixby Slough (Harbor Lake).

COMMON MURRE, *Uria aalge*. Uncommon winter visitor offshore, occasionally seen from land.

XANTUS' MURRELET, *Endomychura hypoleuca*. Uncommon resident offshore.

ANCIENT MURRELET, *Synthliboramphus antiquus*. Casual winter visitor offshore.

CASSIN'S AUKLET, *Ptychoramphus aleuticus*. Uncommon resident offshore; the most frequently reported small alcid. One, Los Angeles Harbor, Sep 1970 (SW).

BAND-TAILED PIGEON, *Columba fasciata*. Rare winter visitor.

ROCK DOVE, *Columba livia*. Introduced, abundant breeding resident.

WHITE-WINGED DOVE, *Zenaida asiatica*. Rare winter visitor; reported every winter in recent years.

MOURNING DOVE, *Zenaida macroura*. Very common breeding resident, abundant in winter.

SPOTTED DOVE, *Streptopelia chinensis*. Introduced, common breeding resident, increasing.

RINGED TURTLE DOVE, *Streptopelia risoria*. Introduced, rare resident. One pair successfully nested in Lunada Bay 1967 (RB).

CANARY-WINGED PARAKEET, *Brotogeris versicolurus*. Apparently introduced in 1972. Now breeding in parks and residential areas and increasing.

YELLOW-BILLED CUCKOO, *Coccyzus americanus*. Extirpated. Formerly nested around Bixby Slough (Grinnell and Miller 1944).

ROADRUNNER, *Geococcyx californianus*. Uncommon, but rarely observed breeding resident; decreasing due to habitat destruction.

BARN OWL, *Tyto alba*. Common breeding resident.

GREAT HORNED OWL, *Bubo virginianus*. Common breeding resident.

BURROWING OWL, *Athene cunicularia*. Uncommon breeding resident. Formerly very common breeding resident, now greatly restricted due to loss of habitat.

SHORT-EARED OWL, *Asio flammeus*. Rare winter visitor, usually seen over open fields.

POORWILL, *Phalaenoptilus nuttallii*. Status poorly known, probably uncommon transient and rare but regular winter visitor.

LESSER NIGHTHAWK, *Chordeiles acutipennis*. Casual in spring and fall.

BLACK SWIFT, *Cypseloides niger*. Accidental. Two, Point Fermin [no date] (SW and DG).

VAUX'S SWIFT, *Chaetura vauxi*. Irregular and uncommon transient, may occur in large flocks.

WHITE-THROATED SWIFT, *Aeronautes saxatalis*. Locally common breeding resident.

BLACK-CHINNED HUMMINGBIRD, *Archilochus alexandri*. Common breeding summer visitor; several records of individuals visiting feeders all winter.

COSTA'S HUMMINGBIRD, *Calypte costae*. Common breeding resident, primarily in open sparse growth of certain canyons; inconspicuous when not breeding.

ANNA'S HUMMINGBIRD, *Calypte anna*. Abundant breeding resident.

BROAD-TAILED HUMMINGBIRD, *Selasphorus platycercus*. Accidental. Miraleste area, One 4 Nov - 18 Dec 1972 and one (mist-netted) 10-17 Apr 1974 (SW).

RUFOUS HUMMINGBIRD, *Selasphorus rufus*. Fairly common transient, rare winter visitor.

ALLEN'S HUMMINGBIRD, *Selasphorus sasin*. The mainland race *S. s. sasin* is a regular migrant. The island race *S. s. sedentarius* is a recently established breeding resident (see text), locally abundant.

CALLIOPE HUMMINGBIRD, *Stellula calliope*. Uncommon transient, most records late April - early May. Males of the species usually preceed females by a week to 10 days.

BELTED KINGFISHER, *Megaceryle alcyon*. Uncommon winter visitor mostly at Cabrillo Beach and the Los Angeles Harbor area. Formerly nested along bluffs above Cabrillo Beach.

COMMON FLICKER, *Colaptes auratus*. Yellow-shafted form, casual or rare visitor, usually in winter. (Most records for this form are intergrades with *C. a. cafer* or other subspecies, but "pure" forms also occur.) Red-shafted form, abundant winter visitor, fairly common breeding resident.

ACORN WOODPECKER, *Melanerpes formicivorus*. Casual, throughout year.

LEWIS' WOODPECKER, *Melanerpes lewis*. Casual, mostly in winter.

YELLOW-BELLIED SAPSUCKER, *Sphyrapicus varius*. Fairly common winter visitor; both *S. v. nuchalis* and *S. v. daggetti* occur.

WILLIAMSON'S SAPSUCKER, *Sphyrapicus thryoideus*. Casual, most records in winter.

HAIRY WOODPECKER, *Picoides villosus*. Several old breeding records from Bixby Slough area (Grinnell 1898) seem unlikely. Only one recent record, Rolling Hills Dec 1969 (SW).

DOWNY WOODPECKER, *Picoides pubescens*. Probably a breeding resident in willows adjacent to Bixby Slough prior to the destruction of this habitat (Grinnell and Miller 1944). Only one recent record, Palos Verdes Estates 26 Nov 1972 (DB, RB, RS).

NUTTALL'S WOODPECKER, *Picoides nuttallii*. Rare winter visitor, less evident in recent years.

WHITE-HEADED WOODPECKER, *Picoides albolarvatus*. Accidental. One, Point Fermin 20 Sep 1972 (EN) and one, Portuguese Bend 27 Sep 1972 (CK).

EASTERN KINGBIRD, *Tyrannus tyrannus*. Accidental. One Lunada Bay Oct 1969 (RS) and one, Averill Park, San Pedro 26 Sep 1971 (GSS).

TROPICAL KINGBIRD, *Tyrannus melancolicus*. Casual in fall and winter.

WESTERN KINGBIRD, *Tyrannus verticalis*. Common transient. Formerly bred (Grinnell and Miller 1944), but no longer found during summer.

CASSIN'S KINGBIRD, *Tyrannus vociferans*. Uncommon transient.

ASH-THROATED FLYCATCHER, *Myiarchus cinerascens*. Fairly common transient and summer visitor, habitat probably insufficient for breeding.

EASTERN PHOEBE, *Sayornis phoebe*. Accidental. One, South Coast Botanic Gardens 10-17 Oct 1972 (SW).

BLACK PHOEBE, *Sayornis nigricans*. Very common breeding resident, very local.

SAY'S PHOEBE, *Sayornis saya*. Common winter visitor.

WILLOW FLYCATCHER, *Empidonax traillii*. Uncommon fall migrant.

HAMMOND'S FLYCATCHER, *Empidonax hammondii*. Uncommon transient.

DUSKY FLYCATCHER, *Empidonax oberholseri*. Uncommon transient.

GRAY FLYCATCHER, *Empidonax wrightii*. Casual in spring and fall.

WESTERN FLYCATCHER, *Empidonax difficilis*. Very common transient. Uncommon summer visitor, nests locally. Casual in winter.

WESTERN WOOD PEWEE, *Contopus sordidulus*. Fairly common transient and summer visitor, no breeding records.

OLIVE-SIDED FLYCATCHER, *Nuttallornis borealis*. Fairly common transient, occasional summer visitor.

VERMILION FLYCATCHER, *Pyrocephalus rubinus*. Accidental. One, South Coast Botanic Gardens 10-18 Oct 1972 (SW). Willett (1933) mentions "records" for the Bixby Slough area.

HORNED LARK, *Eremophila alpestris*. Common winter visitor. Formerly nested, but no recent breeding records. Nearly absent in summer. Decline attributed to habitat destruction.

VIOLET-GREEN SWALLOW, *Tachycineta thalassina*. Common transient.

TREE SWALLOW, *Iridoprocne bicolor*. Uncommon winter visitor, fairly common transient.

ROUGH-WINGED SWALLOW, *Stelgidopteryx ruficollis*. Fairly common summer visitor. Formerly nested but no known breeding records in recent years.

BARN SWALLOW, *Hirundo rustica*. Common breeding summer visitor.

CLIFF SWALLOW, *Petrochelidon pyrrhonota*. Very common breeding summer visitor.

PURPLE MARTIN, *Progne subis*. Rare transient.

STELLER'S JAY, *Cyanocitta stelleri*. Rare vagrant.

SCRUB JAY, *Aphelocoma coerulescens*. Abundant breeding resident. Quite successful in residential areas.

COMMON RAVEN, *Corvus corax*. Locally fairly common breeding resident.

COMMON CROW, *Corvus brachyrhynchos*. Locally common breeding resident.

PINYON JAY, *Gymnorhinus cyanocephala*. Accidental. One, in Rolling Hills 1972 (SW).

CLARK'S NUTCRACKER, *Nucifraga columbiana*. Rare vagrant, mostly in fall.

MOUNTAIN CHICKADEE, *Parus gambeli*. Casual in fall, winter and spring.

BUSHTIT, *Psaltriparus minimus*. Abundant breeding resident.

WHITE-BREASTED NUTHATCH, *Sitta carolinensis*. Rare winter invader from mountains.

RED-BREASTED NUTHATCH, *Sitta canadensis*. Irregular winter visitor, common in some years. One nesting record 1970 (RS).

PYGMY NUTHATCH, *Sitta pygmaea*. Casual in fall and winter.
BROWN CREEPER, *Certhia familiaris*. Irregular and rare winter visitor.
HOUSE WREN, *Troglodytes aedon*. Fairly common transient and winter visitor. No verified nesting records, but individuals sometimes remain throughout summer.
BEWICK'S WREN, *Thryomanes bewickii*. Common breeding resident.
CACTUS WREN, *Campylorhynchus brunneicapillus*. Locally common breeding resident in brushy canyons. Decreasing due to habitat destruction.
LONG-BILLED MARSH WREN, *Cistothorus palustris*. Common breeding resident in freshwater marsh at Harbor Lake.
ROCK WREN, *Salpinctes obsoletus*. Locally common breeding resident in rocky areas. Population decreasing with loss of habitat.
MOCKINGBIRD, *Mimus polyglottos*. Abundant breeding resident. Adapts well to suburban habitats.
BROWN THRASHER, *Toxostoma rufum*. Accidental. One, Cabrillo Beach 23 Dec 1966 through Jan 1967 (GSS, SW) and one, Rolling Hills, 16 Apr - 11 May 1975 (SW, GSS) (McCaskie 1975b).
BENDIRE'S THRASHER, *Toxostoma bendirei*. Accidental. Sight records for Palos Verdes Estates 18 Sep 1968 (RS, DB, RB) and for fall [no date] 1969 (JS).
CALIFORNIA THRASHER, *Toxostoma redivivum*. Accidental. One, South Coast Botanic Gardens 25 Jan - 11 Feb 1974 (SW).
SAGE THRASHER, *Oreoscoptes montanus*. Accidental. One, 11 Sep 1973 (JT) and one 22 Dec 1975 (SW, GN).
AMERICAN ROBIN, *Turdus migratorius*. Very common breeding resident, abundant in winter.
VARIED THRUSH, *Ixoreus naevius*. Irregular and rare winter visitor to parks and wooded areas, may occur in small flocks.
HERMIT THRUSH, *Catharus guttatus*. Common winter visitor.
SWAINSON'S THRUSH, *Catharus ustulatus*. Common summer visitor, nests in Rolling Hills.
TOWNSEND'S SOLITAIRE, *Myadestes townsendi*. Casual, November - March.
BLUE-GRAY GNATCATCHER, *Polioptila caerulea*. Fairly common winter visitor.
BLACK-TAILED GNATCATCHER, *Polioptila melanura*. Fairly common breeding resident in sagebrush (*Artemisia*) covered canyons and gullies, decreasing with habitat reduction.
GOLDEN-CROWNED KINGLET, *Regulus satrapa*. Irregular and rare winter visitor.
RUBY-CROWNED KINGLET, *Regulus calendula*. Very common winter visitor.
WATER PIPIT, *Anthus spinoletta*. Very common winter visitor, decreasing with habitat destruction.
BOHEMIAN WAXWING, *Bombycilla garrulus*. Accidental. One, San Pedro 22 Apr 1969 (SW).
CEDAR WAXWING, *Bombycilla cedrorum*. Very common winter visitor, usually in large flocks.
PHAINOPEPLA, *Phainopepla nitens*. Locally common summer visitor, nests in Rolling Hills. Rare winter visitor.
LOGGERHEAD SHRIKE, *Lanius ludovicianus*. Very common breeding resident in open areas.
STARLING, *Sturnus vulgaris*. Introduced, abundant breeding resident.
HUTTON'S VIREO, *Vireo huttoni*. Uncommon breeding resident, very local.
BELL'S VIREO, *Vireo bellii*. Casual, records for spring and fall.
GRAY VIREO, *Vireo vicinior*. Accidental. Specimen, Point Fermin 9 Sep 1967 (GSS).
SOLITARY VIREO, *Vireo solitarius*. Rare transient. One during winter 1968-69, and one, Dec 1970 - Jan 1971(SW).

RED-EYED VIREO, *Vireo olivaceus*. Accidental. One, San Pedro 13-21 Jul 1971 (SW) and one, South Coast Botanic Gardens 23 Jun 1971 (SW).

WARBLING VIREO, *Vireo gilvus*. Common transient.

BLACK-AND-WHITE WARBLER, *Mniotilta varia*. Casual in fall and spring.

PROTHONOTARY WARBLER, *Protonotaria citrea*. Accidental. One, San Pedro 8 Oct 1965 (DP).

TENNESSEE WARBLER, *Vermivora peregrina*. Casual in spring and fall.

ORANGE-CROWNED WARBLER, *Vermivora celata*. The island race *V. c. sordida* is a fairly common breeding resident, increasing in winter. The mainland race *V. c. lutescens* is very common in migration. A banding study indicated that the other two subspecies are rare transients (Bradley unpubl.).

NASHVILLE WARBLER, *Vermivora ruficapilla*. Common spring migrant, fairly common fall migrant, rare winter visitor (three recent records).

VIRGINIA'S WARBLER, *Vermivora virginae*. Rare transient, occasionally in flocks of up to 10 individuals.

LUCY'S WARBLER, *Vermivora luciae*. Accidental. Two records, Palos Verdes Estates 13 Sep 1970 (RB) and 2 Oct 1974 (SW).

YELLOW WARBLER, *Dendroica petechia*. Common transient, rare in winter. Formerly fairly common breeder, one recent nesting record, Jun 1972 (SW).

MAGNOLIA WARBLER, *Dendroica magnolia*. Accidental. One, Lunada Bay 16 Oct 1970 (RS) and specimen collected, Point Fermin 21 Jun 1974 (CC).

BLACK-THROATED BLUE WARBLER, *Dendroica caerulescens*. Casual in fall.

YELLOW-RUMPED WARBLER, *Dendroica coronata*. "Myrtle" form uncommon to rare winter visitor. "Audubon's" form abundant winter visitor.

BLACK-THROATED GRAY WARBLER, *Dendroica nigrescens*. Common transient. Rare winter visitor.

TOWNSEND'S WARBLER, *Dendroica townsendi*. Common transient. Rare winter visitor.

BLACK-THROATED GREEN WARBLER, *Dendroica virens*. Accidental. One, South Coast Botanic Gardens Oct 1974 (SW, GSS).

HERMIT WARBLER, *Dendroica occidentalis*. Common transient. Rare winter visitor.

BLACKBURNIAN WARBLER, *Dendroica fusca*. Casual in fall.

YELLOW-THROATED WARBLER, *Dendroica dominica*. Accidental. One, South Coast Botanic Gardens 21 Oct 1972 (GM, SW, RB) (McCaskie 1973).

CHESTNUT-SIDED WARBLER, *Dendroica pensylvanica*. Accidental. One, San Pedro [no date] 1972 (SW) and one, Palos Verdes Estates 9 Jun 1973 (RB and DB).

BLACKPOLL WARBLER, *Dendroica striata*. Rare migrant. Usually in fall, but a few spring records. One tape recording (RB) on file at Florida State Museum Bioacoustics Archive.

PRAIRIE WARBLER, *Dendroica discolor*. Accidental. One, Harbor Lake 21 Oct 1967 (SW and JS).

PALM WARBLER, *Dendroica palmarum*. Casual in fall and winter.

OVENBIRD, *Seiurus aurocapillus*. Accidental. One, San Pedro 29 Sep 1967 (SW) and one, 20 Jun 1975 (SW).

NORTHERN WATERTHRUSH, *Seiurus noveboracensis*. Casual in spring and fall.

MACGILLIVRAY'S WARBLER, *Oporornis tolmiei*. Fairly common transient.

COMMON YELLOWTHROAT, *Geothlypis trichas*. Common transient, fairly common breeding resident at Harbor Lake.

YELLOW-BREASTED CHAT, *Icteria virens*. Uncommon transient.

WILSON'S WARBLER, *Wilsonia pusilla*. Abundant spring migrant, very common fall migrant.

CANADA WARBLER, *Wilsonia canadensis*. Accidental. Sight record, Point Fermin 17-21 Oct 1971 (LJ, RW, SW) (McCaskie 1972).

AMERICAN REDSTART, *Setophaga ruticilla*. Rare transient, mostly in fall, sometimes occurs in flocks of 10-15 individuals.

HOUSE SPARROW, *Passer domesticus*. Introduced, abundant resident, especially near stables.

BOBOLINK, *Dolichonyx oryzivorus*. Casual in fall.

WESTERN MEADOWLARK, *Sturnella neglecta*. Very common resident, breeds. Decreasing rapidly due to development of open field habitat.

YELLOW-HEADED BLACKBIRD, *Xanthocephalus xanthocephalus*. Rare winter visitor. Old breeding records for Bixby Slough (Willett 1933).

RED-WINGED BLACKBIRD, *Agelaius phoeniceus*. Very common to abundant breeding resident. Found in large flocks in winter.

TRICOLORED BLACKBIRD, *Agelaius tricolor*. Status like that of Red-winged Blackbird. Breeds north of Harbor Lake.

ORCHARD ORIOLE, *Icterus spurius*. Accidental. One male, Palos Verdes Estates 5 Dec 1971 - 22 Jan 1972 (DB and RB).

HOODED ORIOLE, *Icterus cucullatus*. Very common breeding summer visitor, rare winter visitor.

SCOTT'S ORIOLE, *Icterus parisorum*. Accidental. Two sight records for San Pedro, one Dec 1968 - Feb 1969 (SW) and one, 20 May 1974 (IL).

NORTHERN ORIOLE, *Icterus galbula*. "Bullock's" form very common breeding summer visitor, rare winter visitor. "Baltimore" form casual, with records throughout the year.

BREWER'S BLACKBIRD, *Euphagus cyanocephalus*. Abundant breeding resident.

GREAT-TAILED GRACKLE, *Quiscalus mexicanus*. Accidental. One remained in San Pedro for 9 years (1969-1978).

BROWN-HEADED COWBIRD, *Molothrus ater*. Fairly common resident.

WESTERN TANAGER, *Piranga ludoviciana*. Common to very common transient. Rare winter visitor.

SCARLET TANAGER, *Piranga olivacea*. Accidental. Sight record, male at South Coast Botanic Gardens 14 Jun 1976 (EB, SW) (McCaskie 1976).

HEPATIC TANAGER, *Piranga flava*. Accidental. One, Palos Verdes Estates 28 May 1968 (JT, RB, DB, RS).

SUMMER TANAGER, *Piranga rubra*. Casual in fall and winter.

ROSE-BREASTED GROSBEAK, *Pheucticus ludovicianus*. Casual in fall.

BLACK-HEADED GROSBEAK, *Pheucticus melanocephalus*. Fairly common summer visitor, breeds in riparian situations.

BLUE GROSBEAK, *Guiraca caerulea*. Uncommon to rare transient, formerly breeding (Grinnell and Miller 1944).

INDIGO BUNTING, *Passerina cyanea*. Casual, mostly in fall.

LAZULI BUNTING, *Passerina amoena*. Common transient. Uncommon summer visitor, breeds in some years.

EVENING GROSBEAK, *Hesperiphona vespertina*. Casual in October and November.

PURPLE FINCH, *Carpodacus purpureus*. Fairly common winter visitor, numbers fluctuate greatly from year to year.

CASSIN'S FINCH, *Carpodacus cassinii*. Irregular and rare winter visitor.

HOUSE FINCH, *Carpodacus mexicanus*. Abundant breeding resident.

PINE SISKIN, *Carduelis pinus*. Irregular winter visitor, fairly common in peak years. One summer record, 4 Aug 1968 (SW).

AMERICAN GOLDFINCH, *Carduelis tristis*. Fairly common resident, breeding in low-lying willow areas. Common in winter.

LESSER GOLDFINCH, *Carduelis psaltria*. Common breeding resident.

LAWRENCE'S GOLDFINCH, *Carduelis lawrencei*. Uncommon transient and winter visitor.

RED CROSSBILL, *Loxia curvirostra*. Irregular and rare visitor. A small colony bred during 1967 and 1968. Several scattered records throughout year, mostly in winter (McCaskie 1967).

GREEN-TAILED TOWHEE, *Pipilo chlorurus*. Rare transient and winter visitor.

RUFOUS-SIDED TOWHEE, *Pipilo erythrophthalmus*. Abundant breeding resident.

BROWN TOWHEE, *Pipilo fuscus*. Abundant breeding resident.

LARK BUNTING, *Calamospiza melanocorys*. Casual in late winter and fall.

SAVANNAH SPARROW, *Passerculus sandwichensis*. Fairly common winter visitor. *P. s. beldingi* formerly common breeding resident in the Los Angeles Harbor area; has been extirpated.

GRASSHOPPER SPARROW, *Ammodramus savannarum*. Recorded as breeding near Bixby Slough (Grinnell and Miller 1944). Only recent record is one at Harbor Lake 4 Apr 1974 (AS).

LARK SPARROW, *Chondestes grammacus*. Uncommon winter visitor.

RUFOUS-CROWNED SPARROW, *Aimophila ruficeps*. Local and fairly common breeding resident. Most often found along ocean bluffs.

BLACK-THROATED SPARROW, *Amphispiza bilineata*. Accidental. Sight records, one, Point Fermin (San Pedro) 14-15 Sep 1974 (SW) and one, South Coast Botanic Gardens 5 Sep 1974 (SW).

SAGE SPARROW, *Amphispiza belli*. Casual in fall.

DARK-EYED JUNCO, *Junco hyemalis*. "Slate-colored" form, rare winter visitor. "Oregon" form, very common to abundant winter visitor.

GRAY-HEADED JUNCO, *Junco caniceps*. Rare winter visitor.

TREE SPARROW, *Spizella arborea*. Accidental. One, 6-9 Nov 1974 (SW) (McCaskie 1975a).

CHIPPING SPARROW, *Spizella passerina*. Uncommon winter visitor.

CLAY-COLORED SPARROW, *Spizella pallida*. Casual in fall. Specimen from San Pedro 2 Oct 1968.

BREWER'S SPARROW, *Spizella breweri*. Rare transient.

BLACK-CHINNED SPARROW, *Spizella atrogularis*. Casual in winter and fall.

HARRIS' SPARROW, *Zonotrichia querula*. Casual in winter.

WHITE-CROWNED SPARROW, *Zonotrichia leucophrys*. Abundant winter visitor. Rare stragglers remain throughout each summer.

GOLDEN-CROWNED SPARROW, *Zonotrichia atricapilla*. Very common to abundant winter visitor.

WHITE-THROATED SPARROW, *Zonotrichia albicollis*. Rare winter visitor.

FOX SPARROW, *Passerella iliaca*. Common winter visitor.

LINCOLN'S SPARROW, *Melospiza lincolnii*. Uncommon winter visitor, fairly common transient.

SWAMP SPARROW, *Melospiza georgiana*. Accidental. South Coast Botanic Gardens, one, 3 Nov 1974 (SW) and one, 19 Mar 1975 (SW).

SONG SPARROW, *Melospiza melodia*. Abundant breeding resident.

HYPOTHETICAL LIST

Species listed below have been reported but their occurrence has not been verified.

LEACH'S STORM-PETREL, *Oceanodroma leucorhoa*. One sight record, "a few" just outside Los Angeles Harbor 14 Oct 1973 (DB).

ASHY STORM-PETREL, *Oceanodroma homochroa*. Only report is "In 1931 I saw a single bird off San Pedro September 27, and two or three the following day." (Willett 1933).

BLACK RAIL, *Laterallus jamaicensis*. One heard in marshy sump east of Harbor Freeway [no date) (SW).

LONG-TAILED JAEGER, *Stercorarius longicaudus*. Four specimens taken "off San Pedro" 21 Oct 1928 - 29 Jul 1933 (Willett 1933).

RHINOCEROS AUKLET, *Cerorhinca monocerata*. One "off San Pedro" 29 Aug 1933 (KS) (Willett 1933).

SCREECH OWL, *Otus asio*. Twice reported from Rolling Hills, no verified records.

CHIMNEY SWIFT, *Chaetura pelagica*. One seen well Point Fermin [no date] (DB, RB). One possible sighting South Coast Botanic Gardens 28 Nov 1973 (SW). One or two South Coast Botanic Gardens [summer 197?] (EB).

GREAT CRESTED FLYCATCHER, *Myiarchus crinitus*. One, Point Fermin (west) 26 Sep 1970 (JH, TH, GSS, SW).

PLAIN TITMOUSE, *Parus inornatus*. Two possible sight records, Rolling Hills 24 Dec 1972 (JM).

FIELD SPARROW, *Spizella pusilla*. One sight record, immature plumaged individual 10 Sep 1970 (RB,DB,RS).

SUMMARY

The diverse resident avifuana of the Palos Verdes Peninsula has close affinities to that found on the Channel Islands, but a number of differences are apparent. Perhaps the peninsula's large size and freshwater habitat are the most important factors that modify the insular nature of the avifuana. The position and topography make it attractive to a wide variety of migrant passerines, as evidenced by the number of vagrants included in the checklist. Rapid and continuing development of this area is permanently altering bird populations, and several species have been extirpated as breeding species. Despite this trend, an increasing number of competent field observers are constantly adding new species to the large variety that has been listed. As of January 1976 a total of 333 species of native North American birds had been recorded for the study area. An additional seven introduced and exotic species have become established. At least 10 other species have tentatively been reported, but their occurrence remains hypothetical.

ACKNOWLEDGMENTS

I am indebted to Shirley Wells for innumerable hours spent searching through her records and carefully editing the checklist. I would also like to thank all observers who have contributed records (initials as cited in text): Warren G. Blazer, WB; David Bradley, DB; Richard Bradley, RB; Eric Brooks, EB; David Brown, DBn; Charles Collins, CC; Alice Fries, AF; David Gaines, DG; Jo Heindel JH; Tom Heindel TH; David Holdridge, DH; Lee Jones, LJ; Charles Kegler, CK; Isabel Ludlum, IL; Gerry Maisel, GM; Guy McCaskie, GMc; Richard Milne, RM; Donna Morton, DM; Jess Morton, JMo; Jean Muller, JM; Ed Navajosky, EN; Grace Nixon, GN; Dennis Paulson, DP; Larry Sansone, LS; Russel Scalf, RS; Francis Schneider, FS; Jay Sheppard, JS; George Vennata, GV; Richard Webster, RW; and Shirley Wells, SW. I am also indebted to Ned Johnson and Lee Jones for helpful comments; Tim Manolis, Narca Moore, Shumway Suffel and Alan Craig for their careful editing which greatly clarified this paper. Partial funding for publication of this checklist was provided by the Palos Verdes Audubon Society and the El Dorado Audubon Society.

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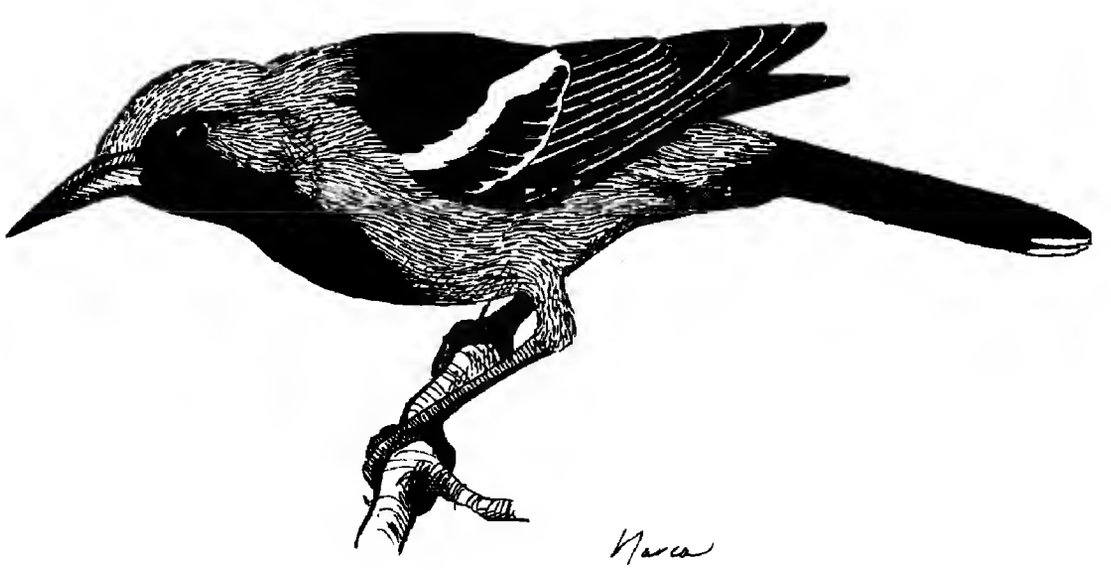
Accepted 5 September 1979



HABITAT PREFERENCES OF WINTERING DIURNAL RAPTORS IN THE SACRAMENTO VALLEY

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KIM R. DEBBAN, 3407 Wood Acres Drive, Boise, Idaho 83705

As slowly reproducing top carnivores, most raptors can be considered potentially endangered (Miller and Botkin 1974). Therefore, accurate data on population trends and their causes, such as pesticide accumulation or habitat alteration, are urgently needed. Olendorff and Kochert (unpublished manuscript) recently stressed the importance of preserving breeding habitat for successful raptor management and conservation. However, considerably less emphasis has been placed on wintering habitat, even though most North American raptors are migratory (Bent 1937, 1938). Relatively little is known about wintering habitat preferences for any raptor species (but see Weller 1964, Schnell 1968 and Koplin 1973); consequently, it is difficult to predict the effects of wintering habitat alterations on raptor populations.

Fifteen diurnal raptors—White-tailed Kite (*Elanus leucurus*), Marsh Hawk (*Circus cyaneus*), American Kestrel (*Falco sparverius*), Merlin (*F. columbarius*), Prairie Falcon (*F. mexicanus*), Peregrine Falcon (*F. peregrinus*), Red-tailed Hawk (*Buteo jamaicensis*), Rough-legged Hawk (*B. lagopus*), Ferruginous Hawk (*B. regalis*) Red-shouldered Hawk (*B. lineatus*), Sharp-shinned Hawk (*Accipiter striatus*), Cooper's Hawk (*A. cooperii*), Golden Eagle (*Aquila chrysaetos*), Bald Eagle (*Haliaeetus leucocephalus*) and Turkey Vulture (*Cathartes aura*)—winter regularly in or migrate through the Sacramento Valley of California. High winter concentrations of some of these raptors occur locally in the valley. To discover if wintering raptors do have habitat preferences we monitored population fluctuations of all diurnal raptors in two habitats in a portion of the central Sacramento Valley by conducting 18 censuses over 190 days from 26 October 1976 to 2 May 1977.

STUDY AREA AND METHODS

The census area comprises 43 km^2 and its southern boundary is located 4.8 km north of Davis, Yolo County, California. Rotating cultivation of such crops as sugar beets, corn, tomatoes and wheat characterizes the central portion of the valley. At any time during the winter months 25 to 50% of the fields are fallow. The valley floor is flat and treeless except along windbreaks and watercourses or near farmhouses.

A private hunting club maintains 7.7 km² of the study area by flooding intermittently and planting cultivated oats. A local tomato cannery uses 1.3 km² as a spray field for their waste water. We consider the sprayfield to be a separate habitat from the agricultural fields because the composition of its vegetation is more heterogeneous. Watergrass (*Echinochloa crusgalli*) is most common although Prickly Lettuce (*Lactuca serriola*), Lambs-quarters (Chenopodium album), Alkali Mallow (*Sida leprosa*), Common Spikeweed (*Hemizonia pungens*), Curly Dock (*Rumex crispus*) and Yellowstar Thistle (*Centaurea solstitialis*) occur frequently. The cannery fenced and posted this area as a raptor preserve in 1975 and occasionally mows it for hay.

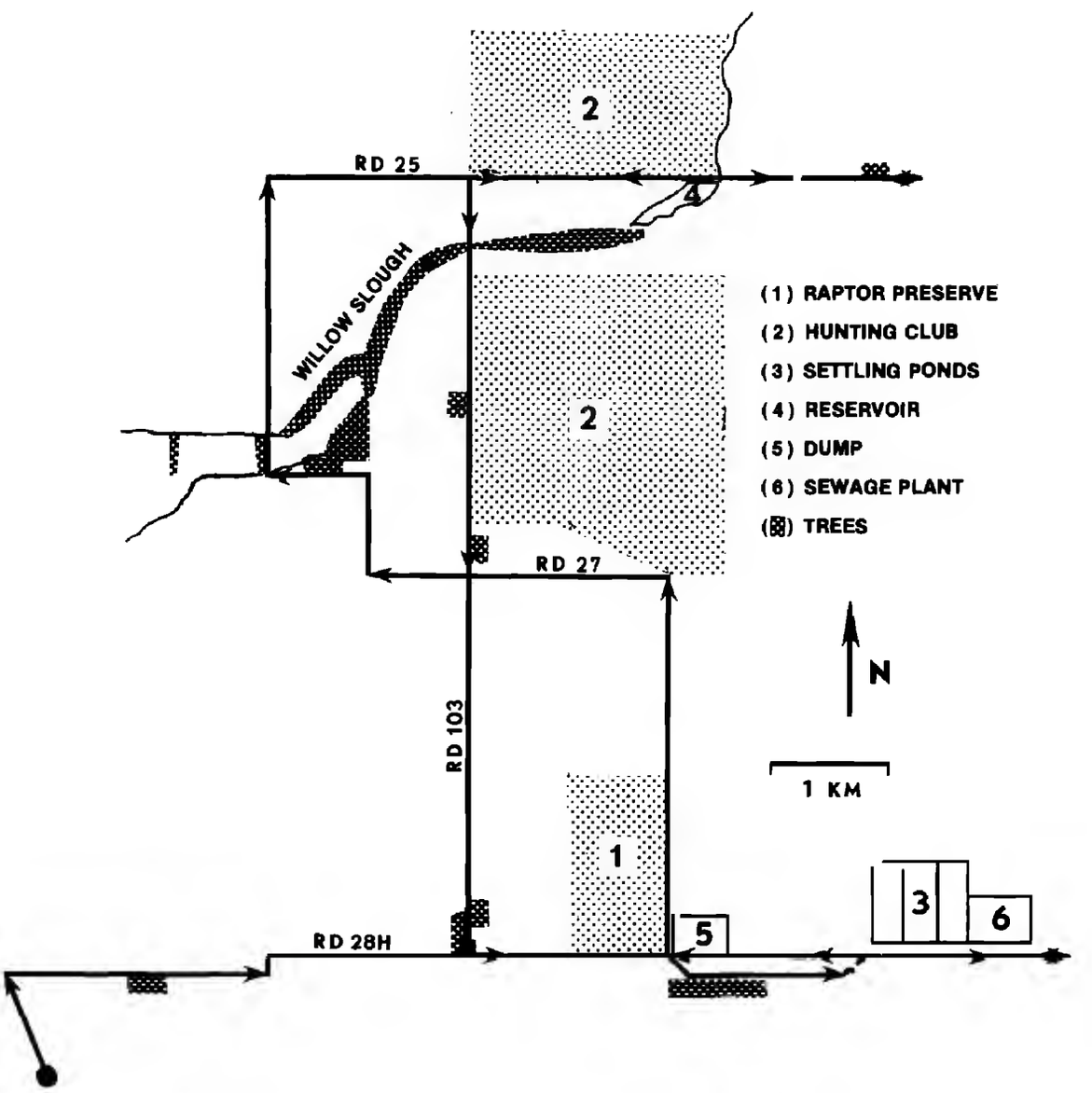


Figure 1. Route driven on each census north of Davis, Yolo County, California. The study area extends 0.8 km on each side of the route; arrows signify direction of travel. The circle denotes the starting point and the square (intersection roads 28H and 103) denotes the ending point.

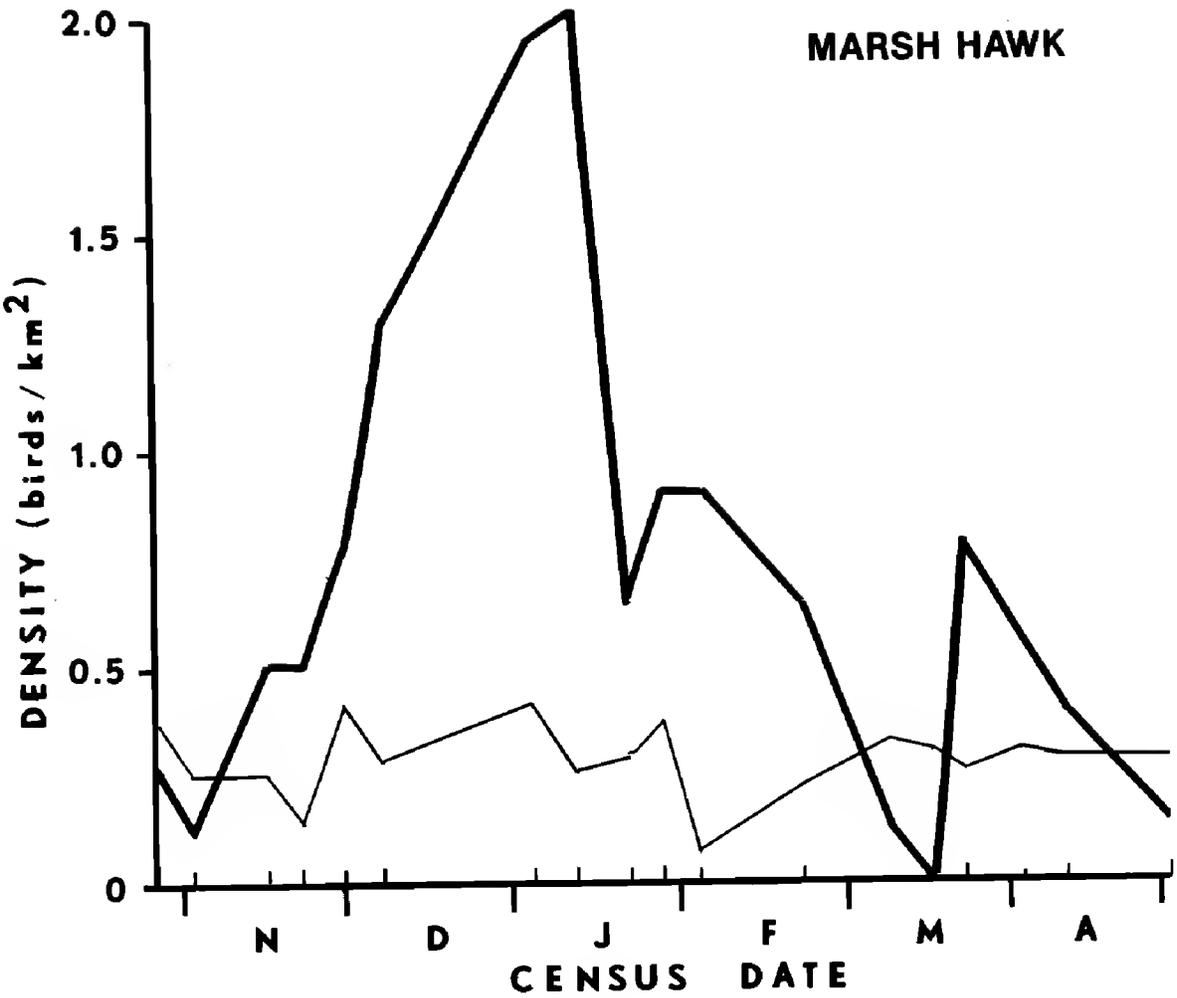
We drove a 37.5 km route (Figure 1) during each census and recorded all raptors seen within 0.8 km of the road. All raptors sighted could be identified to species at this distance using binoculars. These observational limits defined the perimeter of the study area. An average speed of 50 km/hr was maintained for spotting; however, all sightings were verified with our vehicle at a standstill. The location (as well as sex and age when possible) of each raptor sighted was recorded by marking unique symbols for each species' age/sex class at appropriate coordinates on gridded maps of the study area.

Duplication of sighting was uncommon because most birds sighted were perching on telephone poles or sitting on the ground, the census area was large with little overlap, and most censuses lasted approximately 2 hours (mean census time ± 2 SD was 128 ± 45 minutes). However, any birds which were suspected to be recounts due to their direction of movement were not counted. Since there are few trees within the study area, most raptors present were probably observed on each census.

We recorded time of day, minimum and maximum wind velocities and ambient temperature before and after each census. Three of the 18 censuses were conducted in the morning, 2 during mid-day and 13 during late afternoon.

RESULTS

Each of the four common resident raptor species showed marked population changes over the study period (Figure 2). If the population increases were due to the influx of wintering populations, then the winter census tallies should nonrandomly increase over the resident population level. We used the mean of all census tallies as an estimate of the resident population level for each species. Then, we determined if the fluctuations were random or nonrandom by comparing individual census tallies for each species within and outside the raptor preserve to each species' estimated local population level. Outside the preserve, Marsh Hawk and White-tailed Kite populations showed nonsignificant changes, whereas Red-tailed Hawk and American Kestrel populations showed marked changes ($p < 0.001$ in each case, chi-squared test for goodness of fit, Sokal and Rohlf 1969). Within the raptor preserve all four species showed significant population changes ($p < 0.001$ for all cases, chi-squared test for goodness of fit). These results indicate that these four resident species have larger wintering than resident populations and suggest that Marsh Hawk and White-tailed Kite wintering populations concentrate in the raptor preserve.


MARSH HAWK
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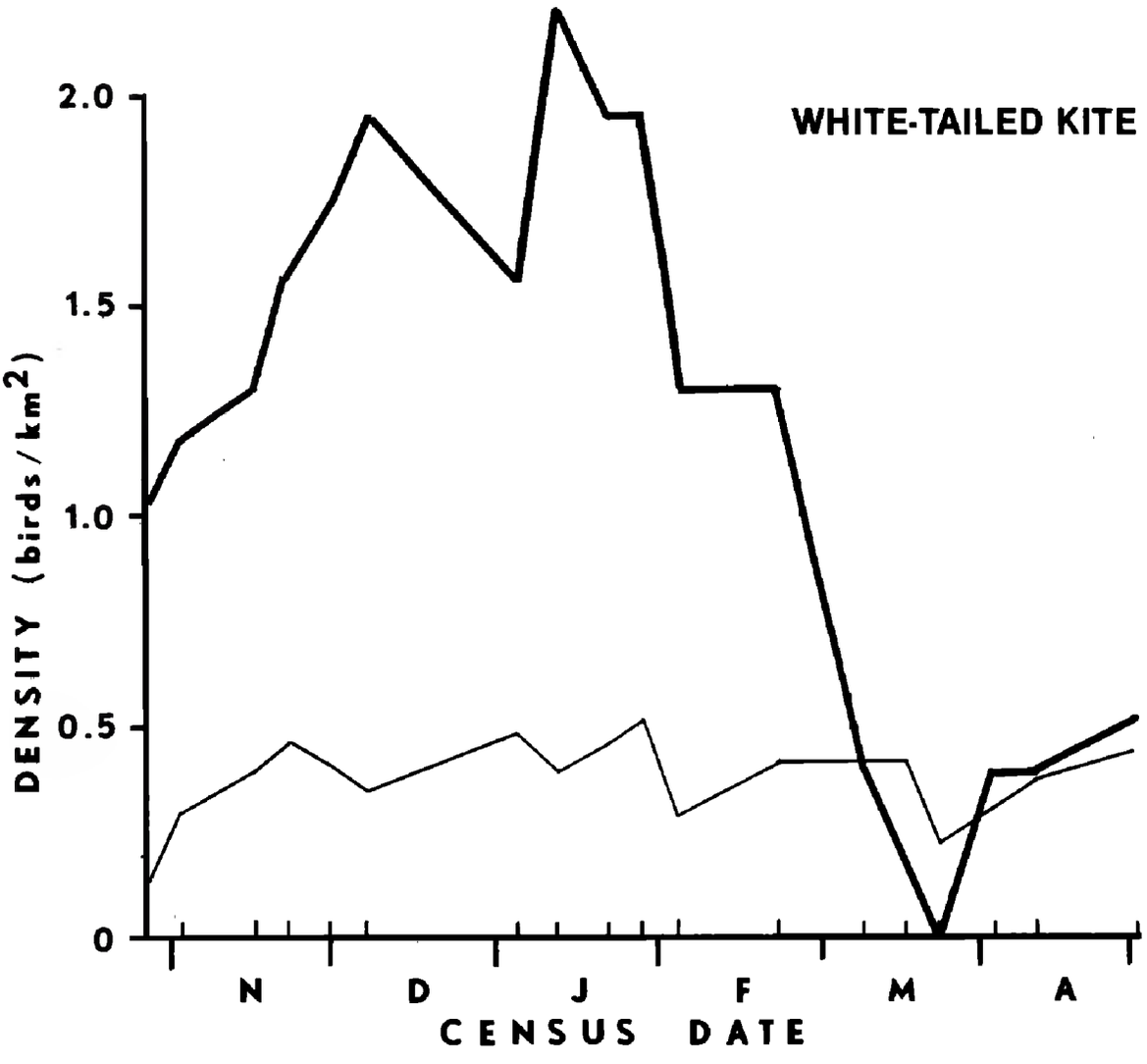
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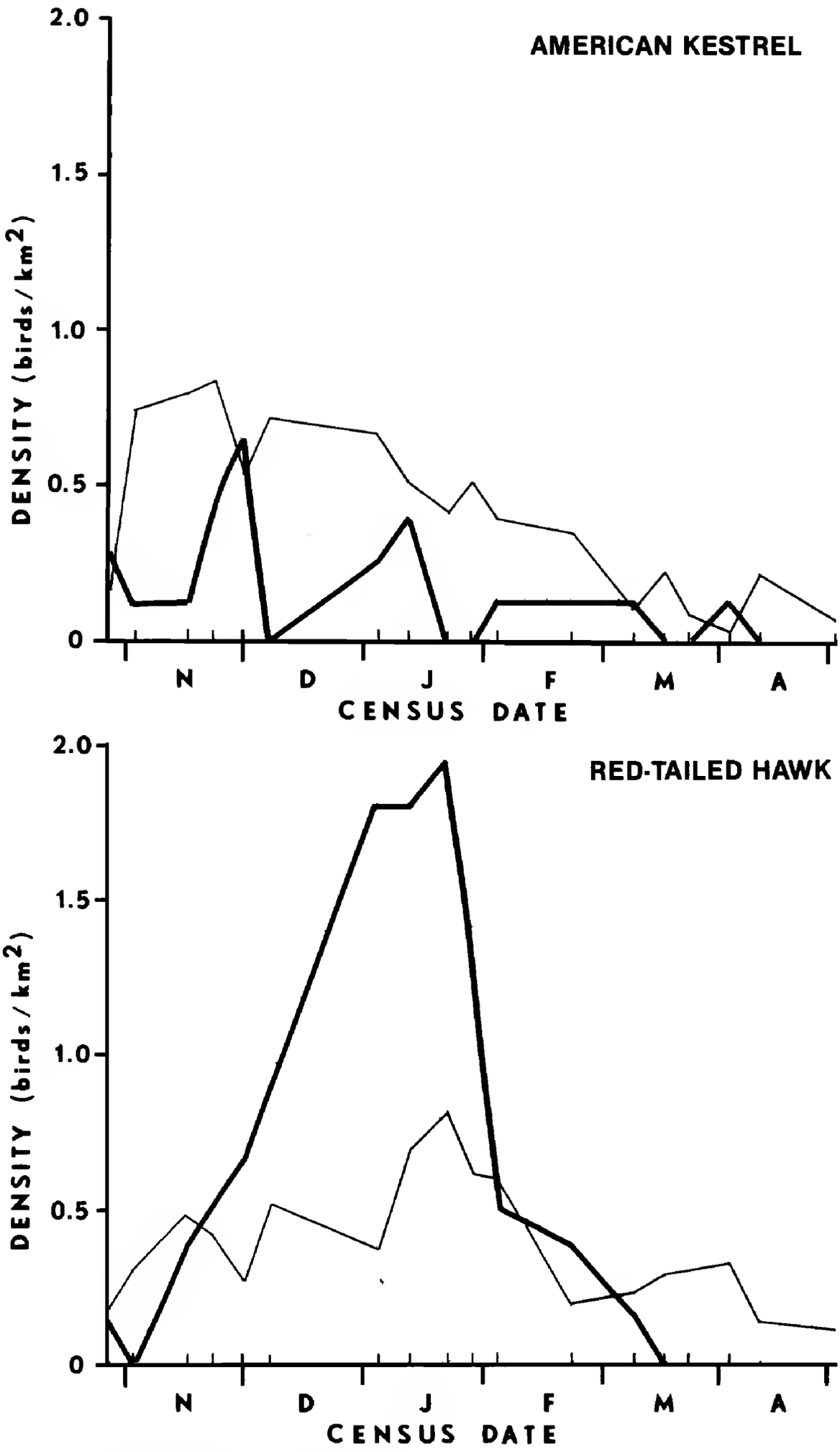

Figure 2. Density fluctuations of the four most common resident diurnal raptors inside the raptor preserve (dark trace) and outside the raptor preserve (light trace). Hash marks above abscissa indicate census dates.

To determine more precisely the habitat preferences of the five winter resident raptors—Red-tailed Hawks, Rough-legged Hawks, Marsh Hawks, White-tailed Kites and American Kestrels—the densities (birds/km^2) of each species within the raptor preserve were compared to densities outside the preserve (cf. Figure 2) with the Wilcoxon test for paired comparisons (Siegel 1956; all probabilities are computed using a one-tailed test). Rough-legged Hawks ($p<0.05$), Marsh Hawks ($p<0.001$) and White-tailed Kites ($p<0.001$) preferentially used the raptor preserve whereas Red-tailed Hawks showed no statistical preference ($p=0.158$) for the raptor preserve over the rest of the study area. American Kestrels showed a statistical avoidance of the preserve ($p<0.001$).

To estimate the effects of weather on our sighting probabilities for each species, we performed Spearman rank correlations (Siegel 1956) between census totals and mean temperature and wind velocity (cf. Figure 3). Marsh Hawk and White-tailed Kite observations were not significantly correlated with wind velocities, whereas Red-tailed Hawk and American Kestrel observations showed significant negative correlations ($r_s=0.57$, $p<0.05$; $r_s=0.59$, $p<0.02$, respectively). American Kestrel observations were not significantly correlated with temperature whereas Marsh Hawk, Red-tailed Hawk and White-tailed Kite observations showed significant positive correlations ($r_s=0.60$, $p<0.02$; $r_s=0.77$, $p<0.001$; $r_s=0.66$, $p<0.01$, respectively).

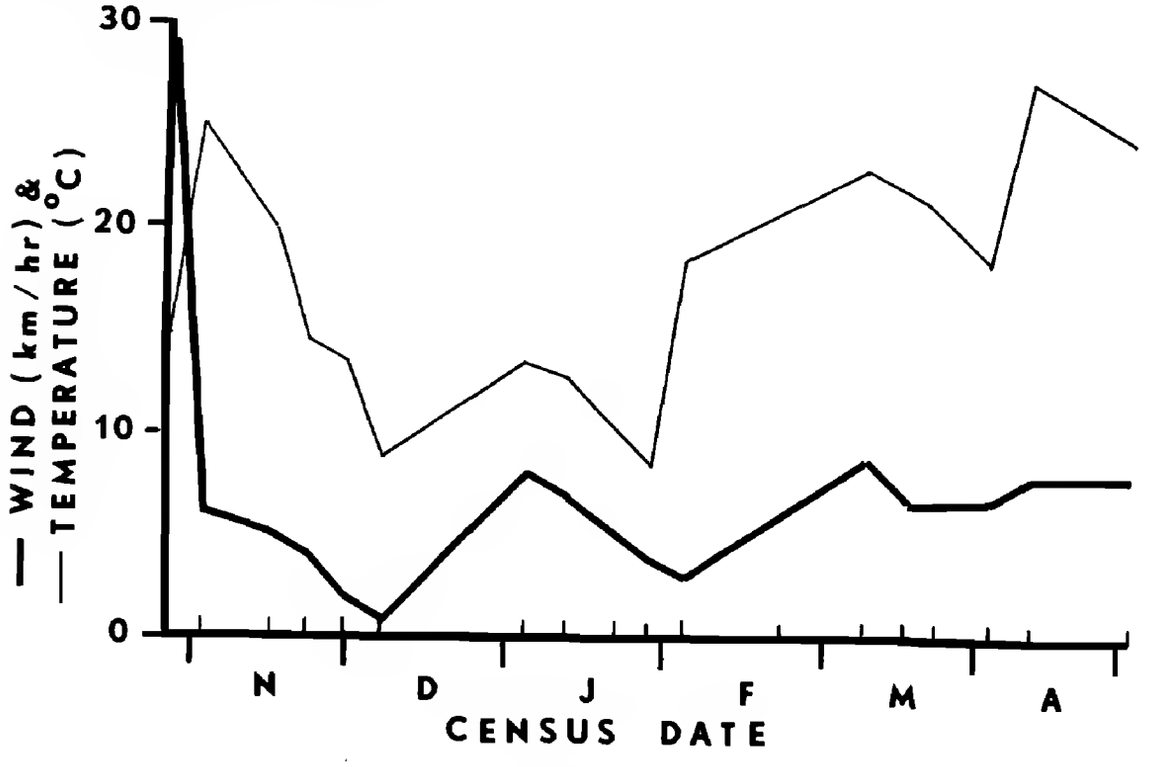

Figure 3. Mean wind and temperature readings for each census, October 1976 to May 1977.

SPECIES ACCOUNTS

Nesting records of each species as well as age/sex information, if known, and dates of observations of uncommon species are presented here. In addition, population status in the study area and the immediate vicinity, based in part on Grinnell and Miller (1944), is included. Status symbols represent transients (T), winter residents (WR), and breeding residents (B).

WHITE-TAILED KITE (WR,B): This species was commonly observed in sugar beet fields south of Road 28H after 1 March. No nest was discovered in the study area although kites were observed there throughout the breeding period.

MARSH HAWK (WR,B): Until 11 March we observed a mean of 5.6 ± 2.9 (± 2 SD) adult males. This relatively low variance suggests that most of the hawks were not transients but winter residents. Unfortunately, first year birds (ventrally buffy to cinnamon without streaking) were not distinguished from adult females (ventrally buffy with streaking) until 22 January. However, most of the winter visitors were either adult females or immatures. A communal roost was used during January within the study area. At least four pairs attempted to nest within the study area, all in sugar beet fields. Three of these pairs contained immature birds. All four nests failed when the beet fields were plowed.

AMERICAN KESTREL (WR,B): Of the 345 kestrels observed through 19 March, 22% were males, 61% were females and 17% were unknown. This relative abundance of females during winter agrees with the findings of Koplin (1973) and Mills (1975, 1976). After 19 March we observed a total of 19 kestrels: 67% males, 22% females and 11% unknown. We believe this reversal in the relative abundances of each sex during early spring is due to the involvement of the females in incubation. A minimum of two kestrel pairs nested in the study area.

MERLIN (T,WR?): A solitary Merlin was seen six times between 12 January and 14 April at one of two locations along road 103 between roads 27 and 25 (cf. Figure 1). On each occasion the falcon resembled an adult male Taiga Merlin (*F. c. columbarius*, Temple 1972).

PRAIRIE FALCON (T): The three sightings occurred on 11 November, 4 January and 22 January at different locations in the study area. Age and sex were not determined on any sighting.

RED-TAILED HAWK (WR,B): Of the 366 sightings, 35% were adults, 30% were immature plumaged and 35% were not aged. No nests were found in the study area. A melanistic bird with jesses was occasionally observed over a period of several months.

ROUGH-LEGGED HAWK (WR): A total of 41 was observed over 15 censuses between 16 November and 6 April. A mean of 2.7 ± 3.6 (± 2 SD) hawks were observed on each of these censuses. Twelve Rough-legs, 10 of which were flying in a group, were observed within the study area on 26 February, a noncensus day. One, which was recognizable by plumage pattern and was the last bird to depart, was observed on the same telephone pole regularly over several months.

FERRUGINOUS HAWK (T): All six were observed during five censuses between 30 November and 23 February. We have no evidence that any bird remained in the study area for longer than one week.

RED-SHOULDERED HAWK (T,B): Solitary birds were observed on 22 and 28 January, and two were observed on 4 February. All sightings were of immature plumaged birds.

SWAINSON'S HAWK (*Buteo swainsoni;* T,B): Two were observed on 6 April, 10 on 14 April and one on 2 May. Fourteen were reported near the study area in mid-April.

Three were observed in the study area on 28 May and also on 22 July. At least one pair attempted to nest within the study area.

SHARP-SHINNED HAWK (T): An adult was observed in the orchard south of Willow Slough on 22 January.

GOLDEN EAGLE (T): A first-year bird (white in wings and tail) was observed flying southeast on 19 March just north of the raptor preserve. A Rough-legged Hawk stooped at the eagle for several minutes.

TURKEY VULTURE (T): Two vultures were observed on 11 March, one on 25 March and two on 14 April. All sightings were of soaring birds.

SHORT-EARED OWL (*Asio flammeus;* WR,B): Although not entered in our census tallies, these owls were seen occasionally at dusk. All sightings were either in the raptor preserve or in the sugar beet fields south of road 28H. We suspect that the owls communally roosted on the raptor preserve on some occasions. A high of 20 was seen over the raptor preserve on 23 January, a noncensus day. At least one pair nested in the sugar beet fields south of road 28H because a fledgling (presumably dead from starvation) was found there within a week after the fields were plowed.

BURROWING OWL (*Athene cunicularia;* WR,B): This owl also was not censused regularly, but at least two pairs nested within the study area. One nest had seven and the other had five fledglings.

DISCUSSION AND CONCLUSIONS

Most wintering raptors in the central Sacramento Valley arrive between October and November (Bent 1937, 1938). These birds leave between March and April although each species may show some variation. Since our data extend from late October until early May, we believe that we have accurate tallies of all winter residents. However, we may have missed a few early fall migrants.

Several of the correlations we discovered between species numbers and either temperature or wind velocity indicate that these two environmental factors influence raptor movements directly or indirectly via the behavior of prey species. The correlations between Marsh Hawk, Red-tailed Hawk and White-tailed Kite census totals and ambient temperature suggest that these species either move locally, migrate or become less detectable during periods of cold weather. The absence of a correlation between American Kestrel numbers and temperature suggests that American Kestrels do not move in response to temperature. This result is expected because these falcons do not rely on thermals to forage. Correlations between Red-tailed Hawk and American Kestrel census totals and wind velocity suggest that these two species also respond to high winds by moving locally and/or become less detectable by perching in protected locations. This interpretation agrees with our casual observations. When the wind was strong (approximately 20 km/hr or stronger), Red-tailed Hawks and American Kestrels almost always were observed perching, whereas Marsh Hawks and White-tailed Kites often were foraging.

Since Marsh Hawks, Rough-legged Hawks and White-tailed Kites preferentially frequented the raptor preserve during the day (and

probably Short-eared Owls did so at dawn and dusk), one or more foods sources may be commonly used by these raptors. All of these species are known to prey on the California Vole (*Microtus californicus;* Craighead and Craighead 1956, Brown and Amadon 1968, Warner and Rudd 1975). Krebs (1966) states that California Voles tend to thrive under irrigated agricultural conditions. Since the raptor preserve is frequently sprayed with waste water, grasses and herbs are usually growing and provide abundant rodent food.

Water Pipits (*Anthus spinoletta*), Brewer's Blackbirds (*Euhpagus cyanocephalus*), Killdeer (*Charadrius vociferus*) and Savannah Sparrows (*Passerculus sandwichensis*) occur frequently and abundantly in the preserve and may provide alternate food sources. Marsh Hawks and Short-eared Owls commonly take avian prey of this size (Craighead and Craighead 1956, Page and Whitacre 1975).

The unusually dry winter of 1976-77 may have caused a reduction in bird and rodent populations in agricultural fields, thereby intensifying raptor congregation at the preserve. In a normal rainfall year, the preserve might be used less frequently. However, on 22 December 1977 more than 15 White-tailed Kites, 6 Rough-legged Hawks and many Red-tailed Hawks and Marsh Hawks were observed on the preserve even though 1977-78 was an above normal rainfall year. These figures are comparable to our census tallies of the previous year, hence the drought may not have had a significant effect. Of course, such an interpretation must be considered with caution because effects of a drought on raptor populations may take several years to disappear.

Three of the central Sacramento Valley winter resident diurnal raptors (Rough-legged Hawk, Marsh Hawk and White-tailed Kite) preferentially frequent the raptor preserve. Recognition of this preference is important because alteration, such as plowing, of preferred winter habitats can cause local movements of raptor populations and may create critical energetic demands if prey is not abundant in nearby areas. We believe that a raptor preserve, such as the sprayfield in our study area, is an effective management area for those species which frequent it, insuring suitable winter habitat for those species in addition to providing an excellent opportunity to view relatively uncommon birds in high concentrations.

ACKNOWLEDGMENTS

We would like to thank Cameron Barrows for assisting with plant identification, John Rice for suggesting some of the statistical procedures, both David Winkler and Tim Manolis for providing many useful comments on the manuscript and Pete Bloom for exciting us with raptor biology.

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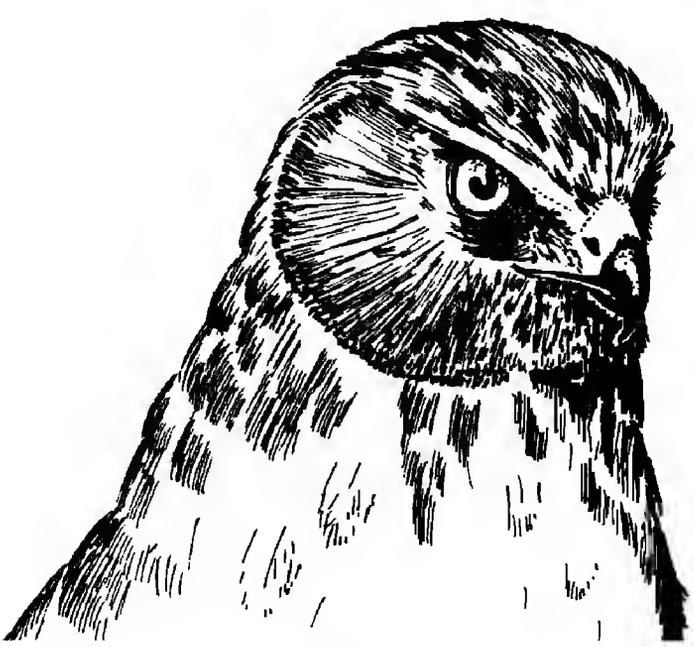

Sketch by Cameron Barrows

BRIEF OBSERVATIONS ON THE BREEDING BIOLOGY OF THE FLAMMULATED OWL IN COLORADO

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Although the Flammulated Owl (*Otus flammeolus*) is found in western North America from Guatemala to Canada (AOU 1957), Reilly (1968) and Winter (1974) concur that little is known concerning the biology of this small, inconspicuous bird. Henry Henshaw suggested that the paucity of information regarding this small owl of montane forests may be due to its secretive behavior rather than actual rarity (Oberholser 1899). In fact, trained observers have recently discovered it to be locally common in some areas (Winter 1971).

During a study of the impact of pesticides on breeding birds in the Pike National Forest, Colorado, we located three Flammulated Owl nests. The nests were all found in 1971 within 6.4 km of each other, about 13 km north and northwest of Divide, Teller County, Colorado. One nest produced two young birds which were orphaned, removed from the nest and raised in captivity. Each of the other two nests fledged three young. Because they were obtained in research incidental to other work, our data on nesting, growth and development of wild and captive nestlings are not extensive.

STUDY AREA AND METHODS

All three nests were found at 2650 to 2775 m altitude in the upper watershed of West Creek. This watershed of the South Platte River system contains a variety of upper montane stand-types, including Ponderosa Pine (*Pinus ponderosa*) on south-facing slopes and Douglas-fir (*Pseudotsuga menziesii*), covering the steeper north-facing slopes. Ponderosa Pine is dominant on the more open south-facing slopes; however, a dry grassland complex occurs on the lower reaches of these slopes (Marr 1961). Moist bottomlands where the nests were found have complexes of willow (*Salix* spp.), Shrubby Cinquefoil (*Potentilla fruticosa*), open meadows and scattered clumps of Quaking Aspen (*Populus tremuloides*), spruce (*Picea* spp.) and fir (*Abies* sp.).

Table 1. Characteristics of Flammulated Owl nest trees (Quaking Aspen) in the Pike National Forest, Colorado.

Nest	S. Platte River tributary	Distance to nearest known nest (km)	Height (m)		Exposure of cavity entrance	Trunk diameter at cavity (cm)
			Cavity	Tree		
1	Phantom	6.4	4.1	14.0	West	38
2	Manchester	1.6	2.4	12.0	East	45
3	Manchester	1.6	7.6	10.0	West	16

Table 2. Growth of nestling and captive young Flammulated Owls.

Date	Nestling weight (g)			Observation
	A	B	C	
Nest 1				
10-17 Jun				Adult near or peering from hole (laying or incubating)
30 Jun-14 Jul				Adult tight in nest, not flushed (incubating or brooding young)
16 Jul	44.0	39.3		Sawed inspection hole; adult (66.8g) on nest
21 Jul	45.5	45.5		No adult seen; claw marks, and section knocked out
28 Jul	32.0	29.6		Dead adult below nest; took nestlings into captivity
1 Sep	61.2	64.6		Maximum captive weight
10 Sep	60.2	64.5		Young released into wild
Nest 2				
30 Jun				Adult incubating or brooding young
7 Jul				Adult perched near nest; three nestlings in nest
10 Jul				Same as 7 July
15 Jul	46.5	41.6	47.4	Sawed inspection hole; adult (58.4g) on nest
21-28 Jul				Nestlings fledged
Nest 3				
2 Jul				Adult tight on nest, not flushed (incubating or brooding young)
7 Jul				Adult flushed off eggs; 2 pipping (1 advanced), 1 intact
10 Jul				Two adults taking food to cavity
13 Jul	29.5	44.4	37.1	Sawed inspection hole; adult flushed from nest
20 Jul	36.9	44.0	31.9	Weighed at 1930
21 Jul	46.3	55.6	42.1	Weighed at 0700
28 Jul	50.6	fldgd	47.9	Weighed at 1530
29 Jul	fldgd		58.1	Weighed at 0830

The nests were found in live aspen by extensive searching and inspecting cavities for potential nesting sites. Hole sizes corresponded to those of the Common Flicker (*Colaptes auratus*) which are apparently favored nesting sites for the species (Bull and Anderson 1978:26-27; Eckert and Karalus 1974:161). The nest cavities are described in Table 1. None of the cavities contained obvious nesting materials other than bits of wood which were presumably left by previous occupants. We found two nests 1.6 km apart along one stream; the third nest was located in a parallel drainage 6.4 km to the west.

Cavities were initially inspected with a viewing tube designed for such use (DeWeese et al. 1975). When the nestlings were about 1 to 2 weeks old, we sawed a section about fist-size at the hole, and periodically photographed and weighed the nestlings. All weighed birds were banded with Fish and Wildlife Service bands. Turnbuckle style window-screen fasteners held the cutout section in its natural position. Cavity alterations were made during daylight hours and, in two instances, when an adult was brooding in the cavity. During the cavity alteration the adult owls were at first sluggish and sleepy when disturbed but offered little resistance, other than some bill snapping. In two nests an adult remained in the cavity, and in the third nest an adult flushed to a nearby perch. All three cavities held young when altered, and the adults did not abandon their nests as a direct result of the cavity alterations. However, we made no attempts to observe discrete behavioral effects.

ACCOUNTS OF NESTS

Weights of nestlings obtained during periodic visits to the three nests are presented in Table 2.

NEST 1

An adult was near or peering out from its cavity on several occasions between 10 and 17 June, but no eggs were observed then. From 30 June to 14 July, we were unable to see the nest contents, because the adult sat tightly within its cavity, refusing to flush. On 16 July we cut into the cavity to band and weigh the brooding adult and its two nestlings. On 21 July we found what appeared to be claw and tooth marks around the hole. Although the sawed section had been knocked out, exposing the two nestlings, both were safe inside and had gained 1 and 6 g during the previous 5 days.

On 28 July a portion of an unbanded adult Flammulated Owl carcass (pelvic girdle with its legs still attached) was found lying at the

base of the cavity tree and the cut-out section of tree was dislodged. Although it was not possible to positively identify the responsible animal, claw marks and other evidence suggested a Bobcat (*Lynx rufus*). However, a Black Bear (*Ursus americanus*) had ripped open a Common Flicker cavity in an aspen tree and depredated the nestlings less than 75 m away only 2 years prior (DeWeese and Pillmore 1972). Our alterations of the cavity hole may have given a predator the advantage necessary to take the adult.

We returned that evening to ascertain whether or not the other adult (banded) was still tending its young. Since both sexes feed young, it was possible that the other adult could raise them. Our concern was well founded because the nestlings had lost 13.5 and 15.9 g (30 to 35%) of their body weight from 21 to 28 July. We observed the nest site and frequently-used perches until 2400 on 28 July without seeing an adult. At that time we fed some moths to both nestlings. Apparently they were not satisfied with our limited supply and their begging calls became more intense. Their additional weight loss overnight and the absence of an attending adult convinced us that they would soon die from starvation; thus, we took the two nestlings into captivity. The banded adult was not seen on subsequent visits to the nest sites.

The two young were about 3 weeks old when captured, based on comparison of their previous weights with the weights of known age nestlings in Nest 3. We fed them mostly live adult grasshoppers (Acrididae), some live moths (Lepidoptera) and an occasional house cricket (Gryllidae). We initially removed the large jumping legs of the grasshoppers, but after a few days the nestlings did so themselves before ingesting them. Food was usually offered in late afternoon, once per day *ad libitum*. No attempt was made to determine the foods of wild Flammulated Owl nestlings in the study area. However, the reported diet is almost exclusively made up of a variety of insects and other arthropods (Jacot 1931, Marshall 1939, Ross 1969). Both birds were first maintained in a large cardboard box, and later moved into a screened garage where they spent much of their captive life. Residence in the garage may have helped them develop hunting and flying skills necessary for survival; the young owls were observed at night capturing insects which were attracted to a light in the garage.

In captivity the young Flammulated Owls apparently derived adequate nutrition for growth from their predominately grasshopper diet. Both birds gained weight and developed full plumage and flight capabilities before release. Pellets of chitinous grasshopper parts were noted in their cage soon after they entered captivity at about 25 days of age. We did not find any pellets in the natural cavities. At this age young in the other two nests were leaving their cavities and may

have been fed more completely digestible foods. Wild young probably trampled beyond recognition any pellets that they regurgitated in their cavities. Our observations agree with Eckert and Karalus (1974:160) who described the pellets as "poorly formed and made up of bits of chitinous material from insects."

Near the end of captivity, at 50 to 60 days of age, the owls were occasionally released into a large indoor room and fed grasshoppers which were placed on a small low perch. At this age, the owls flew well and easily captured fully active grasshoppers (Figure 1). On several nights we saw the owls fly up to catch small moths resting on the ceiling near overhead lights. The owls captured their prey with their feet while in an upside-down position. They would return to their perch and swallow their catches immediately.

The feet were always used to initially capture, then hold the prey for plucking with the beak, if need be, before swallowing. Moths and similar softbodied insects were usually swallowed intact, but large grasshoppers were usually ripped into pieces before swallowing. Grasshoppers were usually swallowed head first, but sometimes were crushed and softened with the beak before being ingested in either large pieces or sometimes intact.

Drinking water was continually provided the captive owls, but not in large enough quantities for bathing. Soon after release, both owls plunged full-body into a nearby stream and bathed extensively. Apparently we should have given them opportunity to bathe in captivity.

When we released the young owls near their natal area on 10 September, they were about 63 days old and had nearly doubled their body weight during 44 days in captivity. About 10 g of their overall gain, however, was apparently needed to make up the weight loss caused by starvation and dehydration during their orphanage in the wild.

NEST 2

This nest was first found on 30 June, but a tenacious adult in the cavity prevented our seeing the nest contents. On two occasions, 7 and 10 July, we observed three downy nestlings in the cavity and an adult perched nearby. Weights and plumage development were only obtained on 15 July (Table 2). This brood apparently left the nest from 21 to 28 July or about 20 to 27 days after hatching, based on known age and weights of Nest 3 nestlings.

NEST 3

When we found Nest 3 on 2 July, a tenacious adult obstructed our view of the contents. On 7 July we flushed the adult off three eggs in

various stages of hatching. One egg was pipping; another was beginning to pip; and the third showed no sign of hatching. On 10 July we observed the pair bringing food to the cavity, and on 13 July we sawed out a section of the nest tree to band and weigh the three nestlings. Over a 12-hour period during the night of 20 July, the weight changes of these nestlings indicated overnight feeding activity (Table 2). The weights of the nestlings from 1930 to 0700 the following morning increased over 10g each. During a 28 July weighing at 1530, the two remaining nestlings (one had fledged) weighed more than their weighing at 1930 on 20 July by 14g and 16g. At 0830 the following morning, the heavier nestling at the 28 July weighing had fledged, and the remaining nestling had gained again about 10g overnight. It is apparent that weights of nestlings may increase by 20 to 25% overnight from feeding, but an actual 20 to 25% weight increase may require about 1 week. Only weights taken at consistent times before the usual feeding periods may be used for a measure of actual weight gains.

Assuming (1) that the heaviest nestling came from the first egg to hatch, and (2) that the lightest nestling came from the last egg to hatch, then the three nestlings in Nest 3 left the nest in <21 days, 21 days and 20 to 27 days after hatching. This 21- to 27-day nestling period for Flammulated Owls would be shorter than the 30 to 33 days (Sherman 1911), 31 to 35 days (Kelso 1950) and 26 days (Bent 1938) reported for Screech Owls (*Otus asio*).

GROWTH OF NESTLINGS

The only weights of known age nestlings were obtained from nestlings in Nest 3 (Table 2). Periodic weighings of these nestlings indicated that midway into nestling life (about 2 weeks old), individual weights varied as much as 20 to 50%. At this time they had attained about 70% of their eventual fledgling weight. At the time of fledging, their weights averaged about 52g. This weight is well within the range for adult Flammulated Owls reported by Johnson and Russell (1962), Johnson (1965) and Earhart and Johnson (1970).

Exact age of the captive owls from Nest 1 was undetermined; however, weight and development comparisons with Nest 3 provided a rough estimate of their age. In addition, lack of parental care and food probably retarded the growth and development of both captive owls. Nonetheless, we photographed the captive owls when they were approximately 1 and 3 weeks old (Figures 2 and 3). We are not aware of published photographs of this species in juvenal plumage.

Figure 1. A captive Flammulated Owl (*Otus flammeolus*), about 6 weeks old, catching a live grasshopper in flight.

Figure 2 A Flammulated Owl (*Otus flammeolus*) in central Colorado removed briefly from its nest cavity for weighing on 16 July 1971 when about 1 week old

Figure 3. Sibling Flammulated Owls (*Otus flammeolus*) when orphaned and taken captive on 28 July 1971 at the age of about 3 weeks in central Colorado

At about 1 week old, the nestlings were still nearly covered with dense down, all white except for a few darkening primary feathers emerging as blood quills (Figure 2). Tail feathers were not at all evident at this age. At 3 weeks, the owls had noticeably changed to a general gray appearance (Figure 3); the body appeared to be completely covered with juvenal feathers. Also, the breast and belly were predominately barred with alternating transverse markings of dark gray and pale gray. Wing and tail feathers showed considerable development and typical adult barring, but the tail was still quite short. By 6 weeks of age, wing and tail feathers were considerably longer and both captive owls could fly up to 30 m. After 7.5 weeks, both owls were capable of sustained flight of about 50 m, and had attained their maximum weight in captivity (Table 2). At the time of release (about 9 weeks old) the owls had developed a few adultlike, barred feathers on breast, throat, wings and tail; however, the overall plumage was clearly more immature than adult.

DISCUSSION

Physical abilities displayed by the captured owls may indicate the capabilities of wild Flammulated Owls at fledging. At about 25 days, the captive owls, weighing about 40 and 45g, would fly 0.5 m down from their perch to their cage floor for food. Prior to that age, rather than actually fly, they would either continue to beg for food from their perch or clumsily jump down to it. They were not observed flying upward to a perch or chasing crippled insects until they were about 34 days old. The timing of this behavior, however, was conceivably a little delayed due to their weight loss and possible retarded development of physical strength prior to captivity. Immediately before fledging, the nestlings from Nest 3 weighed about the same as the 25-day old captives. This fact suggests that the fledgling Flammulated Owls from Nest 3 could branch-climb into a bush or low tree and could move around in the forest in short flights from higher to lower perches, although they were certainly incapable of full flight. A 20 m flight made by one captive owl when it was 5 weeks old suggests that the young owls could easily move around in the forest from tree to tree about 2 weeks after fledging. Well-controlled and directed flight was not observed until they were about 53 days old.

Cavities that were occupied in 1971 and other likely cavities in the adjacent area were observed again during the 1972 breeding season, but no Flammulated Owls were found during extensive searching. Whether their apparent absence 1 year later is due to unpredictability of the species or resulted from our disturbances is unknown. Nest 1 was severely disturbed by a predator, and the tree containing Nest 2

was cut down during the winter of 1971. Our activities, combined with other factors, may have prevented the owls from returning to these specific nesting areas. Future studies should not involve either tampering with or destroying the nesting cavity.

Since this study was completed, other observers have attempted to determine the species' status in Colorado. Winn (1979) found only five active nests and observed 11 owls during intensive searching in the Pike National Forest. She suggested that suitable breeding habitat and nesting sites were probably important in limiting the distribution and abundance of Flammulated Owls in Colorado. Her conclusion was that it is a rare species in Colorado.

SUMMARY

Locations of two Flammulated Owl nests less than 1.6 km apart and a third nest about 6.4 km away suggest that the Flammulated Owl is more numerous in parts of Colorado than previously known. Their obscurity is probably attributable more to behavior than scarcity. Three nests were found in cavities in aspens in the upper montane vegetative type found in moist bottomlands between 2650 and 2775 m elevation about 50 km southwest of Denver. Predation on an adult by a large mammal occurred at one of three nests and may have been encouraged by cutting an enlarged opening into the nesting cavity. Cutting open the cavities was effective for handling adults and nestlings but is discouraged as a routine method for studying these birds. Weight of three nestlings in one nest increased by about 10 g after an overnight feeding, but an actual average weight gain for these 6- to 14-day old nestlings was about 11 g each during 8 days. These wild nestling owls weighed about 50 g before leaving the nest, and two captive nestlings weighed about 60 g when old enough for full flight; two adults weighed 67 g and 58 g. Two captive owls could not fly well for short distances until they were about 7 weeks old. The time from hatching to fledging is estimated to be about 21 days and perhaps up to 27 days.

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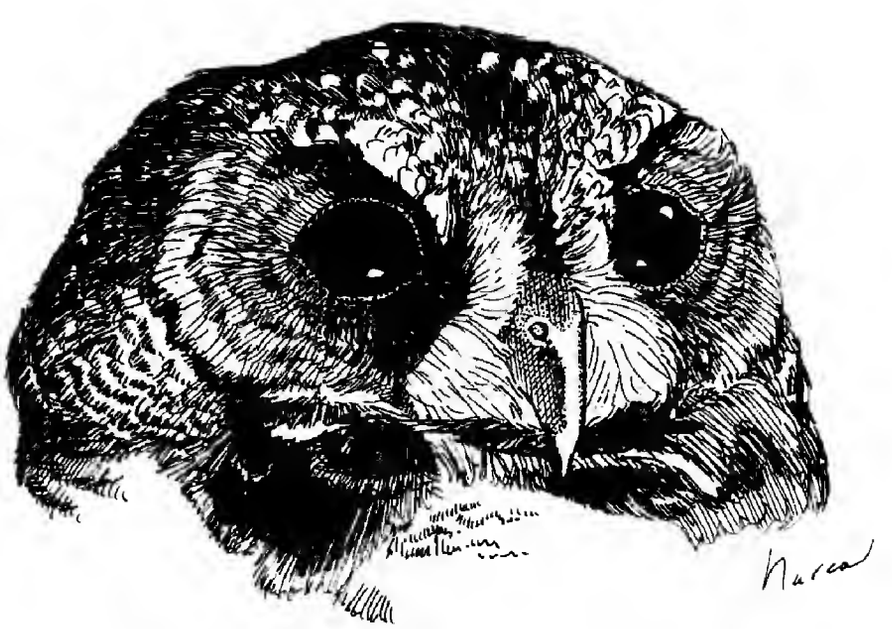
Accepted 8 December 1979



NOTES

A SHORT-TAILED ALBATROSS OFF CALIFORNIA

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On 20 April 1978 at 0900 a subadult Short-tailed Albatross (*Diomedea albatrus*) was observed and photographed (Figure 1) from Moss Landing Marine Laboratories' R/V Oconostota approximately 80 km WNW of Monterey Bay, California (36° 14.9'N, 123° 01.8'W). The bird circled the stern of the boat a few times, once within 20 m, and then departed.

Identification was based upon the characteristic large pink bill, blackish-brown hind neck, mottled belly (white to pale brown), and black tail feathers with a white base. The rest of the body was dark brown but not as dark as a Black-footed Albatross (*D. nigripes*). These characteristics are in agreement with Yamashina's (1961) description of a subadult Short-tailed Albatross. Warren B. King of the Smithsonian Institution and G. Victor Morejohn of Moss Landing Marine Labortories confirmed the identification after examination of the accompanying photograph (Figure 1).

Figure 1. Short-tailed Albatross (*Diomedea albatrus*) photographed approximately 80 km WNW of Monterey Bay, California, 20 April 1978. The color slide from which this print was made shows this bird had a stout pinkish bill, blackish-brown hind neck, mottled belly, stocky large body, dark borders on its underwings, and black tail feathers with a white base.

Photo by Linda A. Belluomini

A subadult Short-tailed Albatross is very similar to an immature Wandering Albatross (*D. exulans*). The bird in Figure 1 can be distinguished as a Short-tailed Albatross based on the shape and stoutness of its bill and body, the distribution of light and dark feathers on its head and neck, and the development of dark borders on its underwing (Richard Erickson pers. comm.).

The most recent sightings of a Short-tailed Albatross off the west coast of North America were by Wyatt (1963) off the Oregon coast in December 1961 and by Keith C. Richards approximately 150 km west of San Diego, California, in August 1977 (McCaskie 1978).

Wahl (1970) observed and photographed a bird that was at first believed to be a Short-tailed Albatross off Washington in May 1970. After extensive reexamination of the photograph, Wahl (pers. comm.) now believes the bird should have been called *Diomedea* sp. On 30 September 1978, 25 km off Newport, Oregon, T. Crabtree photographed an albatross which closely resembled the one photographed by Wahl in 1970. Hunn and Mattocks (1979) expressed doubts as to the identity of the bird photographed by Crabtree.

Traylor's (1950) observation of a Short-tailed Albatross in February 1946 is the most recent northern California record. The present sighting represents not only the most recent confirmed record of a Short-tailed Albatross off the west coast of North America, but the first sighting of this bird off northern California in over 30 years.

The research of Howard and Dodson (1933) and Murie (1959) on American Indian kitchen middens indicates the Short-tailed Albatross was once fairly common along the west coast of North America. Sanger (1972 and 1976) and Hasegawa (1977) believe this nearly extinct bird has been showing signs of recovery. Perhaps this once abundant species will again be a common sight along the west coast of North America.

I wish to thank Michael W. Newcomer for his help in the field and Linda A. Belluomini for providing the photograph. G. Victor Morejohn and my wife provided critical review of this paper and made many helpful suggestions.

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Accepted 2 September 1979

ABILITY OF BLUE-THROATED AND RIVOLI'S HUMMINGBIRDS TO SURVIVE SUBFREEZING TEMPERATURES

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Observations at a bird-feeding station in southeastern Arizona over several winters indicate that, if food is provided, it is possible for the larger native hummingbirds, Rivoli's (*Eugenes fulgens*) and Blue-throated (*Lampornis clemenciae*), to survive periods of subfreezing temperature even while spending considerable time and energy defending artificial nectar feeders.

Prior to 1973-74 there were few records of these two species wintering in southern Arizona, although Christmas Bird Counts at Ramsey Canyon in the Huachuca Mountains included one or both species for 1969 through 1971. In 1973-74 a female Blue-throat spent the winter near Portal, in the Chiricahua Mountains, visiting several feeding stations. That was a relatively mild winter, the temperature rarely going below freezing. Since that year we have had one or two of either or both species winter over each year, feeding on an artificial nectar mixture of 5 parts water and 1 part sugar. On cold nights we brought nectar feeders indoors to prevent freezing, returning them to outdoor hangers at daybreak.

In December 1978 an extreme cold spell hit southern Arizona, when a high pressure system moved into the state from the west, following a period of precipitation. On 7 December at Portal, 18 cm of snow had fallen at our elevation (1500 m) and the temperature remained between -2° and -7°C all day. Considerably more snow had fallen at higher elevations. Four individual male Blue-throated Hummingbirds and two Rivoli's, one an adult male and one a female, fed frequently all day at Portal, with occasional interaction as they attempted to defend the feeders. The morning of 8 December, the temperature was -15°C at our elevation and -20°C at the Southwestern Research Station at elevation 1650 m, 8 km up Cave Creek Canyon from our feeding station. We warmed the sugar water on the stove and replaced it as necessary when the feeders froze. At 0730 the first Blue-throat appeared. After feeding, the bird flew rather sluggishly to a low, nearly leafless mesquite (*Prosopis juliflora*) near the house and perched, fluffed up, just above the snow. At 0800 we discovered that there were three Blue-throats perched close together in the same mesquite (Figure 1). A male Rivoli's then came to the feeder, drank, and flew strongly up into a large evergreen oak tree (*Quercus emoryi*).

Surrounding mountains and cliffs prevent direct sun rays from touching our yard in December until 0900. Shortly after the sun illuminated the feeders, the Blue-throats became more active and by 0930 one was guarding the bottles, driving away the others, and even challenging a House Finch (*Carpodacus mexicanus*) and a Bridled Titmouse (*Parus wollweberi*) which ventured near the sugar water. At 1000 we realized that there were four Blue-throats but we never noted all four perched in the mesquite at one time. The temperature reached -5°C in the early afternoon, with bright sun and no wind. The last sighting was at 1715 when one Blue-throat drank and flew off. We did not see a female Rivoli's that day.

On 9 December the temperature was again -15°C at daybreak and we repeated the routine—putting out warm sugar water and rewarming it at intervals throughout the day. The first Blue-throat appeared at 0715 and seemed stronger than at first appearance the previous day, although it still perched low in the mesquite and made no attempt to fly up to its usual higher daytime perches. A second individual appeared at 0730 and displayed mild aggression. We were certain of only three Blue-throats and one male Rivoli's Hummingbird that day.

In mid-morning I noticed that one Blue-throat had his mandibles spread apart, and his tongue, coated with ice, was hanging out. He attempted to feed but could not get his beak into the tube. As he was weak, I managed to catch him and bring him inside where I thawed his tongue, let him rest inside a paper bag, and then fed him. He drank steadily in short sips for almost 5 minutes. At first his tongue extended into the tube only a few millimeters, but eventually it came out full length as he drank. I released him and he flew strongly up into the oak tree.

The temperature again that day reached only -5°C. When not feeding, the hummers usually perched low in the mesquite, although sometimes the Rivoli's, when not in the oak, came onto a low crossbar beneath the seat of a folded lawn chair leaning against the house. Several times in the late afternoon a Blue-throat landed on the ground outside the door, once in the snow, but flew off when I attempted to catch him.

On 10 December the early morning temperature was -11°C; that afternoon it finally went above freezing (1°C) and the crisis seemed to be over. Three Blue-throats and one Rivoli's had survived almost 90 hours of below-freezing temperatures, but it must be noted that except on the 7th, the sun shone brightly and there was no wind.

On 11 December, with a temperature span of -6° - +4°C, there was considerable aggression among the hummingbirds. Blue-throats seemed dominant over the Rivoli's, and the "boss" Blue-throat appeared to be a first-year bird, judging by his incompletely blue throat.

The periods of perching in the low mesquite, during times of lowest temperature, were sometimes as long as 30 minutes. We speculate, although it was impossible to determine, that the birds went into a state of partial torpidity at this time, and presumably also overnight, in order to survive. They assumed the position described by Bartholomew, Howell and Cade (Condor 59:145-155, 1957), with bill pointing upward about 45° and feathers greatly fluffed (Figure 1).

We had noted previously that in cold rainy spells in April, after a number of the migrating and summering hummingbirds had returned, up to a dozen might be seen perching low in the same mesquite, from 15 cm to 1 m above the ground. Presumably

Figure 1. Three Blue-throated Hummingbirds perched close to the ground in snow-covered mesquite in subfreezing temperature, 8 December 1978, Portal, Arizona.
Photo by S.H. Spofford

the low perch offered protection from wind and perhaps some warmth from the ground.

As already pointed out here, once warmed up and well fed in the morning, the birds turned to feeder defense. More detailed observations of this type of behavior had been made by us in December 1974 when the problem of mere survival did not seem so acute.

On 8 December 1974 it began snowing lightly in late morning and the male Blue-throat, which usually perched high in the oak tree between visits to the feeder, took up a perch on the bent wire from which one of the feeders was suspended, under a porch roof, where he was sheltered from the falling snow and a scant 2 m from my desk (Figure 2). The temperature was just a few degrees above freezing. From this perch he repeatedly drove away a female Blue-throat and a male Rivoli's Hummingbird, both of which were trying to come to the feeders. When I realized he was staying almost continuously on this perch, I observed his behavior for 2.5 hours beginning at approximately 1430. During this period he was off the perch, other than to feed, a total of only 24 minutes, 11 minutes of which was just before going to roost. He sometimes fed from a gravity feeder while perched on its supporting wire but more often at a "flying saucer" type feeder with three small tube-openings, on the rim of which he perched while sipping.

During this time period, whenever he was on his perch, his head jerked constantly, bill pointed upwards, the head jerks coming at one-second intervals. Frequently, while facing the house, he looked back at the direction from which intruding birds usually approached.

When he drank from the feeder, located 50 cm from his perch, it was usually for less than 30 seconds, involving four to eight quick sips at a time. During the 2.5 hour observation period he visited the feeders almost 20 times, feeding a total of less than 10 minutes during this period.

Figure 2. Male Blue-throated Hummingbird guarding feeder during snow storm, December 1974, Portal, Arizona.

Photo by S.H. Spofford

Whenever the male Rivoli's or the female Blue-throat approached, even to visit a feeder 4 m or more from his perch, he immediately flew after the intruder, sometimes pursuing it for 100 m or more. Then he returned either to the oak tree or directly to the wire perch under the eaves.

A Painted Redstart (*Myioborus pictus*) made repeated visits during this time to the sugar water feeders. The reaction of the Blue-throat was to chirp loudly, jerk his head more rapidly, and occasionally to leave the perch to buzz around the warbler. However, this hummingbird paid no attention to House Finches which came to "his" feeders.

At 1630 the temperature had dropped just below freezing and other birds were leaving the feeding area. During the last 20 minutes before the Blue-throat disappeared for the night, he did considerable twitching and wing-fluttering, and seemed to be breathing more rapidly. At 1656 he left the perch, took two quick sips of nectar and vanished. The following morning he returned to the feeders at 0730 and spent most of the day there, though not so continuously on the perch. He returned the next day when the temperature dropped to -8°C and survived the day.

It is of interest that at a time when the bird must be hard pressed just to survive, because of low temperatures, it still expends considerable energy in aggression and defense of feeding territory.

These field observations did not of course permit use of techniques employed by Lasiewski and Lasiewski under laboratory conditions (Auk 84:34-38, 1967) to ascertain exact physiological responses in the species discussed in this paper. However our field observations show that the hummingbird species that survived artificially induced low temperatures of the laboratory can also survive subfreezing temperatures in the wild, provided they have access to food during the day.

Accepted 23 November 1979

FIRST RECORD OF THE HUDSONIAN GODWIT FOR OREGON

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On 23 August 1978 Tom Lund found a lone gray-backed godwit (*Limosa* sp.), which he tentatively identified as a Hudsonian Godwit (*L. haemastica*), near the ponds at the base of the South Jetty of the Columbia River, Clatsop County, Oregon. However, he was unable to observe the coloration of the underwings and the extent of the white stripe on the upper wing surfaces required to distinguish the Hudsonian Godwit from the similar Black-tailed Godwit (*L. limosa*) of Palaearctic distribution. Lund described the bird as being in full basic plumage, with a plain gray back (pers. comm.). Tad Finnell and Brian Egger obtained brief views of what appeared to be the same bird on 24 August, but they, too, were unable to note the critical field marks. The bird could not be located after that date.

On 10 September 1978 Nancy Mesner and I found and identified with certainty a Hudsonian Godwit with a group of approximately 50 Marbled Godwits (*L. fedoa*) along the edge of the mudflats on the north spit of the Coquille River estuary, north of Bandon, Coos County, Oregon. The Coquille bird appeared to be still molting its back feathers and was noticeably mottled in that region, making it, most likely, a different bird than the one observed in Clatsop County. The Coquille bird was considerably smaller than the Marbled Godwits and was about the same size as or slightly smaller than the Willets (*Catoptrophorus semipalmatus*) which were also present. The Hudsonian's bill was upcurved but shorter than those of the Marbled Godwits. The bill was dull reddish toward the base and dark in the distal portion. In flight, a broad black band near the end of the white-tipped retrices, a white rump and basal portion of the retrices, and narrow white stripes on the open wings were clearly visible. Dark underwings were noted as the bird turned in flight. Several of the above mentioned characters, especially the limited white wing stripes and dark underwings, served to distinguish the bird from the Black-tailed Godwit. The flock flushed and disappeared before photographs could be obtained.

However, on 17 September Tad and Kathy Finnell, Jeff Gilligan, David Irons and I relocated the Coquille bird. It was studied closely by all those present and was photographed extensively by Gilligan (Figure 1). Additional field marks were noted on this date, including some rusty feathers near the base of the bill and a broad white superciliary line anterior to the eye. The neck and upper chest were a dusky gray; the belly, a lighter shade. The legs were dull greenish-brown. The bird was observed for about 30 minutes feeding with up to 100 Marbled Godwits. During the week following 17 September the Coquille bird was seen by several other observers, including Tom Crabtree, who photographed it on 19 September (Figure 2).

The Hudsonian Godwit breeds in north-central Canada through extreme northeastern Alaska and winters mostly in the southern third of South America. Its usual migration routes take it up through the Great Plains in spring and, sparingly, to the Atlantic coast in fall. Most autumn migrants pass over North America without stopping (Palmer 1967). There are a few records for this species in California, Washington and British Columbia, and the occurrence of the bird reported here constitutes the first substantiated record for Oregon. The scarcity of records for the western North American coast would seem to preclude the existence of any regular movement through the region. The Coquille godwit occurred in Oregon in the same period when unprecedented numbers of the Buff-breasted Sandpiper (*Tryngites subruficollis*), a species whose usual migratory pathways are somewhat similar to the Hudsonian Godwit's routes, were being recorded all along the Pacific coast (Hunn and Mattocks 1979, McCaskie 1979, Winter and Laymon 1979).

Figure 1. Hudsonian Godwit (right) and Willet (left), Coquille River estuary, Coos County, Oregon, 17 September 1978.

Photo by Jeff Gilligan

Figure 2. Hudsonian Godwit, Coquille River estuary, Coos County, Oregon, 19 September 1978. 300 mm lens, f8, 1/500 sec.

Photo by Tom Crabtree

The Coquille River estuary provides excellent habitat for many migratory shorebirds, with large concentrations, especially of the larger species, gathering there. The first three Bar-tailed Godwits (*L. lapponica*) found in Oregon, one in 1976 and two in 1977, were seen in this same location (Crowell and Nehls 1977, Hunn and Mattocks 1978). The Coquille River estuary is in need of careful management to preserve it as a valuable natural area and refuge for migratory birds.

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Accepted 4 February 1980

SUMMER RECORD OF THE TREE SPARROW IN CALIFORNIA

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The Tree Sparrow (*Spizella arborea*) has generally been considered a rare winter visitant in California, most frequently found in the northeastern portion of the state (Grinnell and Miller, Pac. Coast Avif. no. 27, 1944). McCaskie (West. Birds 4:65-70, 1973) summarized all California records and demonstrated that the Tree Sparrow was somewhat more abundant and wide-ranging than previously realized, listing five spring records (May and June) from the Farallon Islands and one on board a ship farther south. He suggested that a record for 14 June might be the latest south of the Canadian border. More recent spring records from the Farallon Islands (Am. Birds 29:906, 1975; 31:1045, 1977; 31:1187, 1977) extend the latest date to 26 June.

On 20 July 1979 I found a dead Tree Sparrow at the side of an unpaved and seldom used road through low but dense chaparral at an elevation of about 120 m, 2.7 km northeast of Piedras Blancas Point, San Luis Obispo County, California. I had traveled along the road twice in the previous 24 hours and had not seen the bird, although it may have been there. The fully adult female sparrow was emaciated (weight 11.7 g) and slightly dried, but in good enough condition to be prepared as a museum specimen (USNM 576101). The cloaca and under tail coverts were caked with dry droppings. The specimen is of the subspecies *S. a. ochracea,* as are all California examples (McCaskie op. cit.).

This apparently constitutes the first summer record of a Tree Sparrow anywhere south of Canada. McCaskie (op. cit.) listed three winter records farther south in western California. This individual must have been a winter visitor that for some reason failed to return north.

I thank Harlan Brown for permission to work on this property and Guy McCaskie for calling recent records to my attention.

Accepted 26 December 1979

POSSIBLE HELPER AT A LONG-EARED OWL NEST

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Nest-helpers and polyandric trios are known to occur in a few diurnal raptor species (de Vries 1973, Mader 1975, Wiley 1975, Wegner 1976). Among owls polyandry has been reported in the Barn Owl (*Tyto alba*) and in Tengmalm's (= Boreal) Owl (*Aegolius funereus*), and polygyny has been reported in the Common Scops Owl (*Otus scops*), Snowy Owl (*Nyctea scandiaca*), Tawny Owl (*Strix aluco*), and Tengmalm's Owl (references in Kondratzki and Altmüller 1976). Because actual genetic investment in the clutch is almost never known in such cases, we use the term helper in the broad sense of another conspecific that assists in the reproductive effort. The helper may be a former offspring of the nesting pair with no direct genetic investment, or a polyandrous female's or polygynous male's mate with a variable amount of genetic investment. Of the two major facets of helping behavior, feeding of young and defense of nest/young, the former would be exceptionally difficult to observe in strigiform birds. This paper reports circumstances including nest defense which suggest a helper at a Long-eared Owl (*Asio otus*) nest.

During October and November 1977 R. Watson regularly observed three Long-eared Owls roosting in a dense thicket of climbing vines in a growth of Narrowleaf Cottonwoods (*Populus angustifolia*) along the Bear River near Amalga, Cache County, Utah. The birds may have remained through the winter and summer, but he did not return to look for them. He again found three Long-eared Owls roosting in the same thicket in the third week of October 1978. From that time on, three owls were seen regularly throughout the winter by several observers, including TAS. The birds roosted near the ground and usually within about 10 m of each other.

In April 1979 a nest was discovered near the roosting thicket. It was in an old nest of a Black-billed Magpie (*Pica pica*), about 3 m off the ground in a tilted dead snag, and situated over marshy ground within a dense thicket. The first eggs hatched between 29 April and 2 May (S.B. Vander Wall pers. comm.). Given an incubation period of 21 days (Bent 1938), egg-laying must have begun on about 10 April. When we visited the nest at 2100 on 19 May, it contained four owlets. The female, who had been brooding, circled about our heads and bill-clacked. She was quickly joined by another bird with a noticeably paler facial disc (presumably a male). Both flew about bill-clacking, swooped within 1-3 m of our heads, and performed dramatic "broken wing" distraction displays in the brush. Within 5 minutes a third Long-eared Owl appeared and it also flew around us, bill-clacked, and then dropped to the ground in some brush to perform a distraction display. The third owl's facial disc also appeared paler than the female's, suggesting it was a male (Bent 1938).

Three adult owls were present when we returned at 2100 on 25 May; two flew around bill-clacking, and the third remained perched. At 2030 on 27 May two adults defended the nest, which then contained only one young. We found a white elliptical egg, cracked and nearly empty, beneath the nest; its measurements, 42 mm × 34 mm, were well within the range for the Long-eared Owl (Bent 1938). At 2000 on 2 June the nest was empty but two adults appeared and seemed disturbed. Probably the young, which began to climb out on branches on 20 May (W.T. Bledsoe pers. comm.) at about 19-21 days of age, were somewhere nearby in the brush.

Asio otus is migratory (at least some individuals) or nomadic in parts of its range, and resident in others (Craighead and Craighead 1956, Mikkola 1973, Marti 1974, Glue 1977). In northern Utah it is thought to be a permanent resident (Behle and Perry 1975), but individuals may show some altitudinal movement. Roth and Powers (1979) found that a pair of Long-eared Owls in southwestern Idaho occupied essentially the same territory during the fall, winter and nesting seasons. We believe that the

three birds present through the 1978-1979 winter were the same individuals later associated with the nest. Furthermore it seems possible that the same birds wintered and perhaps nested there in 1977-1978, implying a long-term polygamous association. The nest was located about 1 and 2 km from two small cattle feedlots and adjacent to extensive grassy fields. Thus a rich and probably rather constant food supply of mice, Starlings (*Sturnus vulgaris*) and other prey was available throughout the year.

Concentrations of Long-eared Owl nests have been reported in Utah, California, Arizona and Idaho (Henshaw 1875, cited in Bent 1938; Stophlet 1959; L.R. Powers pers. comm.). However, this situation is often associated with a shortage of nesting trees, and there was no shortage of trees in our study area. We searched without success for another nest in the vicinity. In addition the Long-eared Owl, being chiefly a montane species in this area, is uncommon in the valley. Because of the long-term presence of three associating adults we think the alternative to the nest-helper hypothesis, that the third defending adult was associated with a second nest, is unlikely. This alternative would imply cooperative defense and entail tolerance by a nesting pair of a third adult in the immediate vicinity of their nest. We doubt that a third adult, particularly in a predatory species, would be tolerated so close to a nest with young unless it was helping. Polygyny seems the least likely of the three helper categories because: (1) two birds had relatively pale plumage, indicative of males (Bent 1938); and (2) the probable clutch size of five was not unusually large for Long-eared Owls (Bent 1938).

In view of the known social tendencies of this owl and the likelihood that young remain with their parents during their first winter (Bent 1938:166, Wilson 1938), its social system merits close attention.

ACKNOWLEDGMENTS

We are grateful to W. Thomas Bledsoe Jr., Kathy Fite, Stephen B. Vander Wall and Roger Watson for sharing information about the owls. Keith L. Dixon, Carl D. Marti, Leon R. Powers and Charles H. Trost provided encouragement and useful suggestions on the manuscript.

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Accepted 4 February 1980

DIPPERS IN MARINE HABITATS IN WASHINGTON

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At about 0930 on 19 June 1977 we observed a Dipper (*Cinclus mexicanus*) on the north side of Castle Rock, located near the south end of Lopez Island, Puget Sound, San Juan County, Washington. The bird was hopping and flying along the rocks just above the water level. We were able to observe this bird for about 2 minutes before losing sight of it. We did not observe feeding behavior by this bird. However, on 28 July 1977, we observed a Dipper feeding on beach hoppers (*Orchestia traskiana*) stirred up by construction activity along Rosario Beach, Fidalgo Island, in Skagit County. This bird appeared quite tame and approached human activity within a few meters.

Miller et al. (1935) did not include this species in their listing of the birds of the San Juan Islands. Dawson (1909) noted that the Dipper "retires to lower levels, even rarely, to sea coast in winter," and Jewett (1953) wrote that this bird is a resident in Washington "from near sea level to timber line." However, we can find no record of Dippers frequenting coastal areas during the summer months, or of shoreline feeding activities such as we observed (e.g. see also Kitchen 1934, Larrison 1942, Wahl and Paulson 1974). Gabrielson and Lincoln (1959) indicated that Dippers are found regularly from Unimak Island to Unalaska Island in the Aleutians, and on all the major islands of southeastern Alaska. But again no mention is made of the presence of these birds in a marine habitat.

Vader (1971), however, observed European Dippers (*Cinclus cinclus*) feeding on marine invertebrates in the brackish waters of a fjord in western Norway in October. Also, Bannerman noted that European Dippers frequent tidal estuaries in the winter and that during severe frosts they can be found along the seashore. Our observations suggest that North American Dippers, like their European counterparts, are opportunists capable of exploiting the marine habitat for feeding purposes. Additional observations along the Northwest coast should be made to determine better the nature and extent of this exploitation.

These observations were made while we were on the summer faculty of the Walla Walla College Marine Station, Anacortes, Washington.

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Accepted 21 March 1980

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